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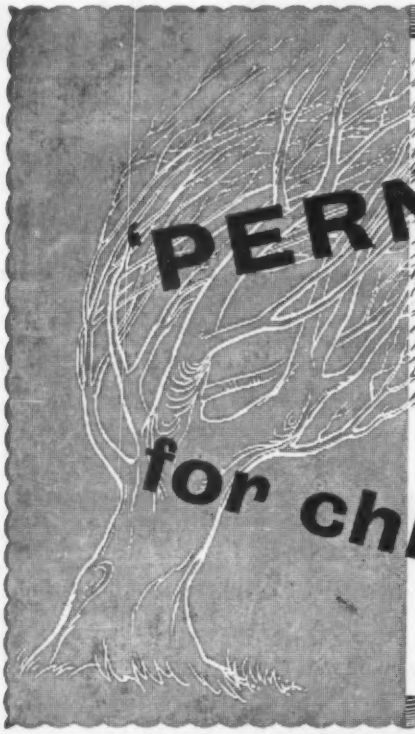

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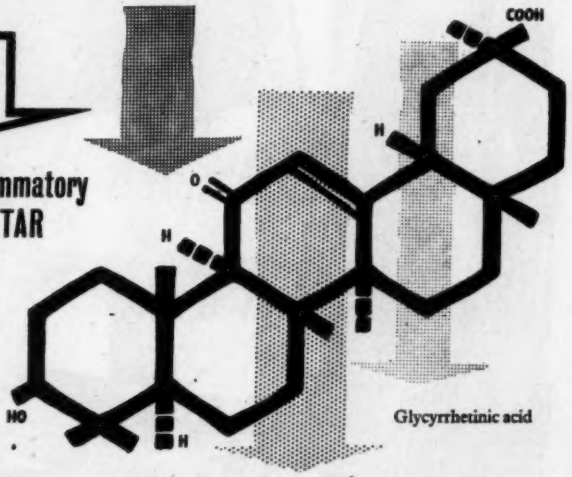

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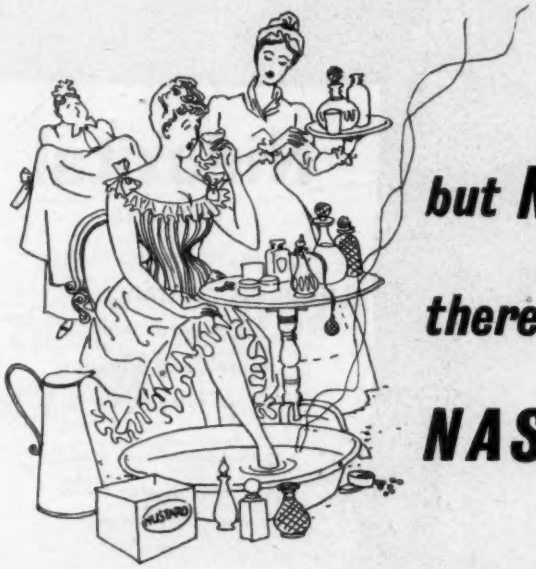

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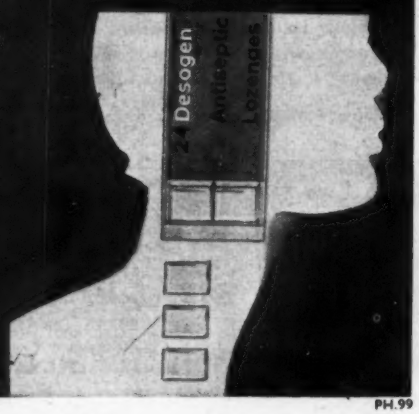

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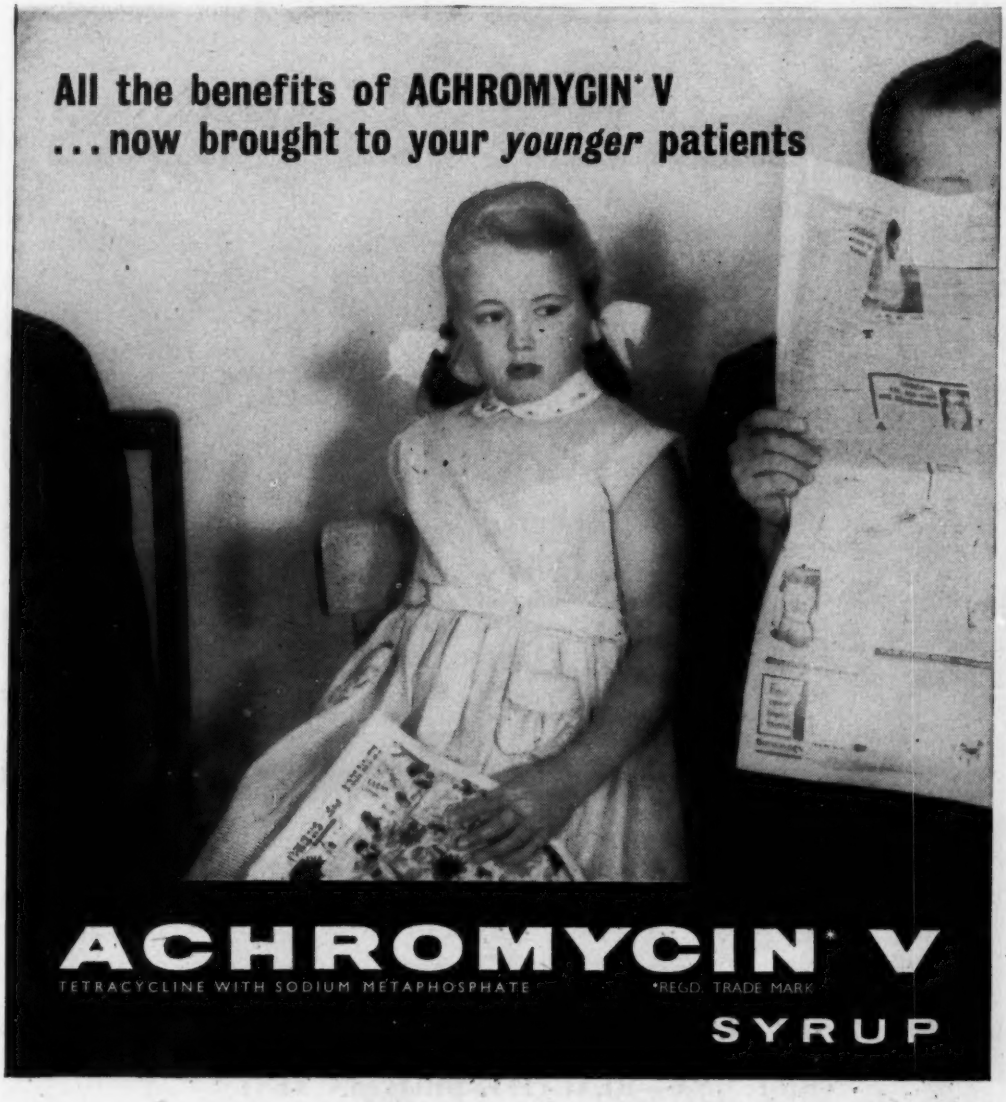

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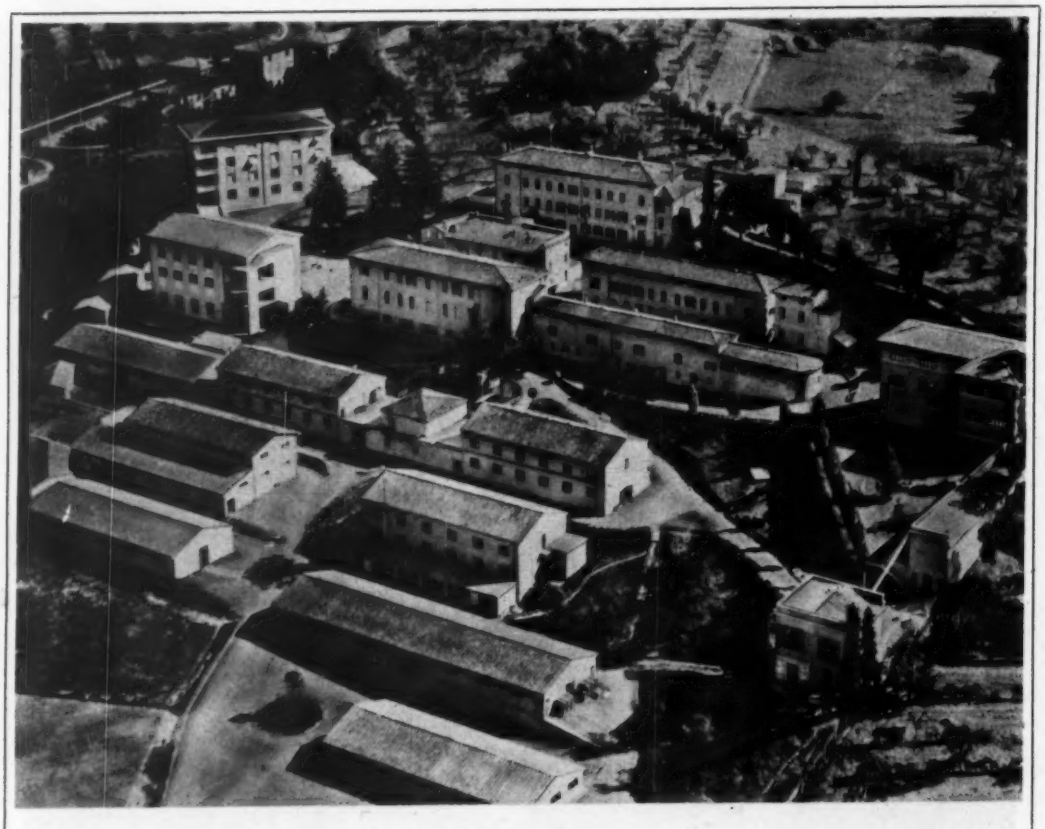

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widely used throughout the world

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Antigens for serodiagnosis of syphilis
"C—REACTIVE PROTEIN TEST"
Diagnostic Reagents

PHARMACEUTICAL SPECIALITIES
CHLORAMPHENICOL

A wide and interesting range of Chloramphenicol and Corticosteroid preparations

Prepared by
ISTITUTO SIEROTERAPICO E VACCINOGENO TOSCANO

Direttore :
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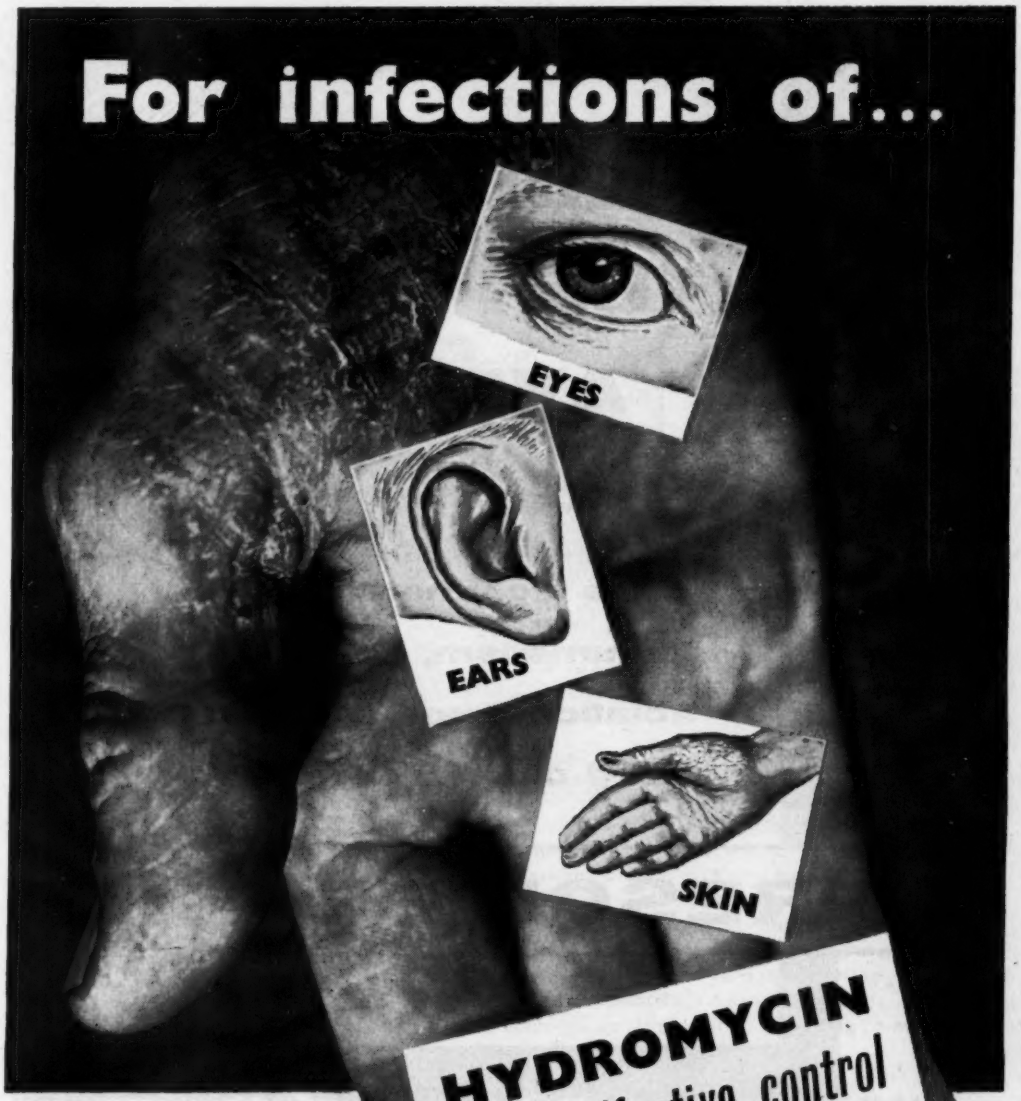
"SCLAVO"

SIENA
(Italy)

For infections of...



HYDROMYCIN gives effective control

HYDROMYCIN—a combination of hydrocortisone and neomycin for prompt and effective control of both inflammation and infection.

SAFE · EFFECTIVE
PROMPT IN ACTION · WELL TOLERATED

HYDROMYCIN
OINTMENT
1% Tubes of 5 and 15 G.
EAR/EYE OINTMENT
1.5% Tubes of 3 G.
EAR/EYE DROPS
1.5% Bottles of 5 c.c.

Literature and further information gladly sent on request.

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Boots

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13

REDUCE THE E.C.10 AVERAGE COST *

In the treatment of Rheumatism, Fibrositis, Sciatica, Lumbago and allied conditions.

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Long Acting Rubefacient Balm

*** Basic N.H.S. price 1/2½d. per oz.**

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Signs of the times...

Few doctors have need to depend on Nature's signs to learn that winter is close at hand. Day by day, the steadily growing population in the waiting room provides an equally eloquent barometer! Time now to enlist VI-MAGNA multivitamins for those of your patients particularly prone to winter ills. The routine is eminently simple: just one VI-MAGNA Capsule or one teaspoonful of Syrup daily throughout the winter months. Remember—every dose of VI-MAGNA provides the important supplementary factors in carefully balanced amounts... every dose contributes to improved well-being during the testing months ahead.

Vi-Magna* CAPSULES & SYRUP

BRAND OF MULTIVITAMINS *REGD. TRADE MARK

Each Capsule contains :	
Vitamin A	5,000 I.U.
Vitamin D (viosterol)	500 I.U.
Thiamine mononitrate	3 mg.
Riboflavine (B_2)	3 mg.
Pyridoxine HCl (B_6)	0.2 mg.
Ascorbic acid (C)	75 mg.
Niacinamide	20 mg.
Calcium pantothenate	1 mg.
Folic Acid	1 mg.
Vitamin B_{12} (as present in concentrated extractives from streptomyces fermentation)	1 mcgm.

Bottles of 100 and 1,000

Each teaspoonful (5 cc.) of Syrup contains :	
Vitamin A (palmitate)	5,000 I.U.
Vitamin D	500 I.U.
Thiamine HCl (B_1)	3.0 mg.
Riboflavine (B_2)	2.0 mg.
Niacinamide	20.0 mg.
Ascorbic acid (C)	75.0 mg.
Calcium pantothenate	1.0 mg.
Pyridoxine HCl (B_6)	0.2 mg.
Vitamin B_{12} (as present in concentrated extractives from streptomyces fermentation)	5.0 mcgm.

Bottles of 4 and 16 fl. oz.

CYANAMID 50 1907 1957

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GRAND MAL EPILEPSY

"... a state produced by intense, spontaneous neuronal activity which has a tendency to spread throughout the grey matter of the brain with unbridled augmentation ... like a prairie fire"

W. Penfield.

EPANUTIN* (phenytoin sodium) offers four epileptics out of five the opportunity of leading normal lives. The control of seizures by this powerful anticonvulsant is achieved with negligible hypnotic effects, and is frequently accompanied by improved psychological outlook and mental alertness. Some cases of *grand mal* respond better to a combination of Epanutin and Phenobarbitone than to either of these drugs given separately.

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anticonvulsant with minimal hypnotic action

Epanutin Capsules (1½ grs. and ½ gr.) bottles of 100 and tins of 1,000.
Epanutin and Phenobarbitone Capsules. Each capsule contains 1½ grs. Epanutin and ½ gr. Phenobarbitone. Bottles of 100 and tins of 1,000.
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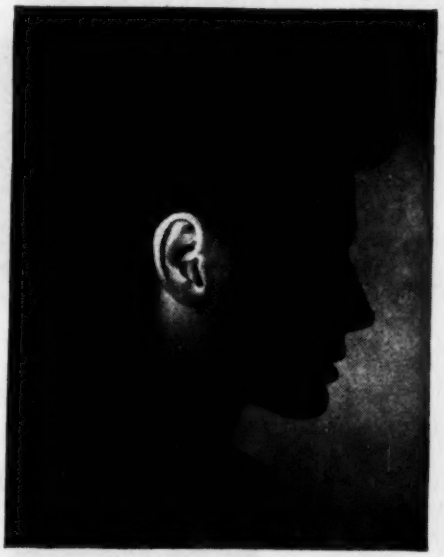
EAR WAX

Removed this easy way



The removal of wax from the external auditory meatus has, in the past, normally entailed attendance by the patient for diagnosis and for the prescription of a suitable loosening agent, and a second attendance a few days later for syringing. Now, by the use of Cerumol Ear Drops, wax can be removed in most cases at one visit. A few drops of Cerumol can be instilled into the ear and, while another patient is being attended to, the soft cerumen dissolves and the harder wax disimpacts. The wax can then be removed by gentle syringing or with cotton wool. The wax may even be found to run out of the ear on its own accord, in which case patients themselves may instil Cerumol at home, obviating further attendances. Cerumol is anti-bacterial, non-irritating and harmless to the lining of the external auditory meatus or the tympanic membrane. Cerumol is included in Category No. 4 of the M.O.H. classified list and may be prescribed on N.H.S. Form E.C.10.

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EAR DROPS

for the easier removal of wax

If you wish to test for yourself and have not received recently a 10 c.c. vial please write or telephone direct to :

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PACKS for Surgery Use : 10 c.c. vial — separate dropper included.
(Basic N.H.S. price 2/8.)
For Hospital Use : 2 oz. and 10 oz. bottles.

Calms the troubled seas of the mind

Clinically proven

SPARINE*

(PROMAZINE HYDROCHLORIDE)

Psychoactivity, anti-emetic action, and enhancing effect on analgesics—these are the three important properties that make Sparine so valuable in general as well as in specialist practice.

Clinical experience reveals its effectiveness in controlling acute agitation, nausea and vomiting and in the management of pain. And the reports further show that Sparine offers a safe and dependable method of treatment, well tolerated by oral or parenteral administration and remarkably free from serious side-effects.

Full details on indications and dosage are available on request.

PACKS:

For parenteral use:
5% solution in 2 ml. ampoules. Boxes of 10.

For oral use:
Tablets in bottles of 50 and 250.
25 mg. (yellow); 50 mg. (orange); 100 mg. (red)

Wyeth

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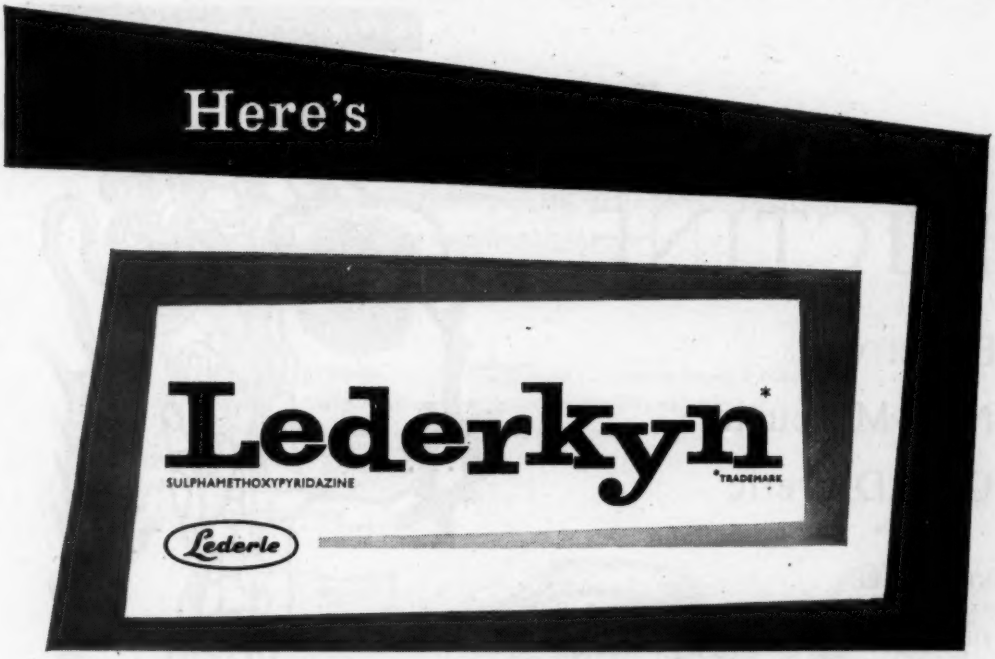

Lederle's new low-dosage, long-acting sulpha drug

LEDERKYN is unique among sulpha drugs:

It is the first long-acting antibacterial sulphonamide available for clinical use

Its low "1/2 Gm.-a-day" dosage means better tolerance and less likelihood of side effects

Its rapid absorption and slow excretion mean high blood levels for long periods

Published reports show the superiority of LEDERKYN brand over earlier sulphonamides

Round-the-clock therapy with 1/2 Gm. a day

Tablets of 0.5 Gm. *Bottles of 24, 100 and 500*

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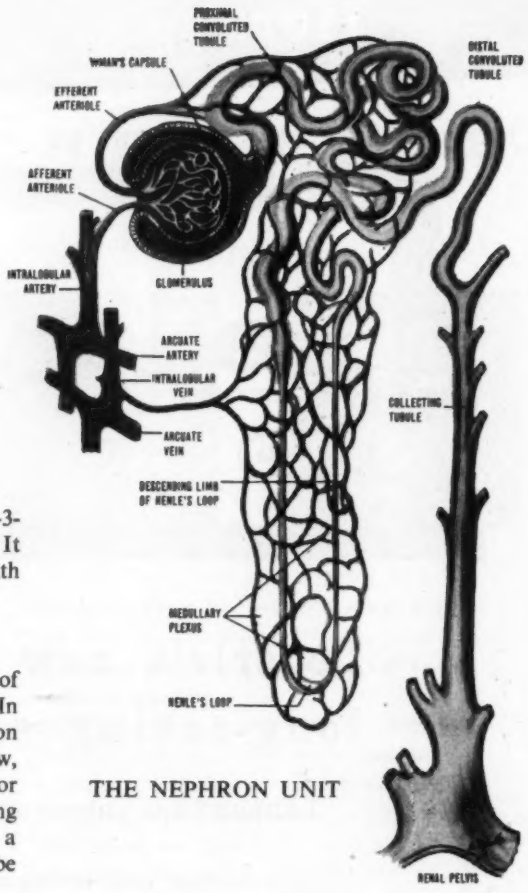
A PRODUCT OF SEARLE RESEARCH

MICTINE*

Effective, Non-Mercurial Oral Diuretic



THE NEPHRON UNIT

STRUCTURE

"Mictine", brand of aminometradine, is 1-allyl-3-ethyl-6-aminotetrahydropyrimidinedione. It avoids the undesirable side-effects associated with mercurial, xanthine or sulphonamide agents.

ACTION AND EFFECTIVENESS

"Mictine" is believed to act by inhibition of sodium ion absorption in the renal tubule. In therapeutic dosages it has not caused any effect on glomerular filtration rate, renal plasma flow, cardiac output, heart rate or blood pressure, nor any alteration in the blood or blood-forming tissues or in renal or hepatic function. In a group of unselected patients 70 per cent. may be expected to respond to "Mictine".

TOLERANCE

"Mictine" is not toxic at therapeutic dosages. On the other hand, side-effects do occur such as headache and gastro-intestinal symptoms. These are reduced to a minimum if an interrupted dosage scheme is adopted.

ADMINISTRATION

"Mictine" is indicated in the maintenance of an oedema-free state in any patient requiring diuretic therapy and the effecting of initial diuresis in all patients but those with severe congestive failure. For these purposes the dosage is one to four tablets daily in divided doses *during meals* on alternate days or on three successive days followed by four days without therapy. "Mictine" is not intended to produce initial diuresis in more severe congestive failure; however, "Mictine" may be given when other diuretics are contra-indicated, or if tolerance to them has developed.

Available in bottles of 25, 100 and 500 tablets each containing 200 mg. aminometradine.

Full literature is available to the medical profession on request. G. D. Searle & Co. Ltd., High Wycombe, Bucks. Tel. High Wycombe 1770.

**Registered Trade Mark*

SEARLE

MI : P86

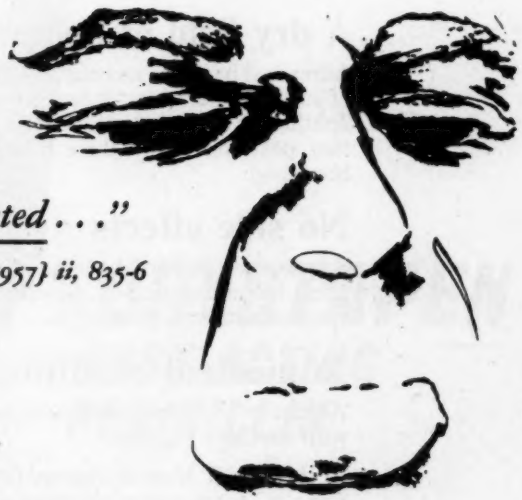
the basic problem

"Apart from the impossibility of testing the antibiotic-sensitivity of the bacterial flora of more than a small fraction of the affected population, the onset of pneumonia may be so sudden and catastrophic that immediate chemotherapy is essential . . ." †

one name

". . . the real dilemma . . . whether to aim the attack primarily against H. influenzae, *using the tetracyclines or chloramphenicol, or against* Staph. aureus *with erythromycin or novobiocin."* †

In a single preparation Sigmamycin answers this dilemma. It is rapidly effective against *both* these organisms.



". . . patients may die within twenty-four hours if not effectively treated . . ."

"Bacteria and Influenza" † *Lancet (1957) ii, 835-6*

the only one name

". . . the best course may be to use a combination of antibiotics from both groups . . ." †

(The broad and medium spectrums)

Sigmamycin, which contains tetracycline and oleandomycin, is the *only* preparation currently available in this country which meets this description in a single preparation.

the complete answer

sigmamycin*

oleandomycin tetracycline

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ADRENOXYL

Reduces the mean bleeding-time

Adrenoxyl reduces the mean bleeding-time by decreasing the permeability and increasing the contractility and resistance of the capillary wall.

A dry field at operation

Adrenoxyl has been successful in diminishing capillary bleeding in a wide range of surgical operations. It has proved particularly useful in ear, nose and throat, ophthalmic and plastic surgery. In plastic surgery of the face it has been reported that, post-operatively, there is less swelling and bruising when Adrenoxyl has been used.

No side effects

Adrenoxyl does not have any side effects or contraindications. It does not affect blood coagulation, blood pressure or pulse rate and does not possess any sympathomimetic properties.

In medical conditions

Adrenoxyl has been used with success in those medical conditions associated with capillary fragility.

In the British Medical Journal (April 21st, 1956) a correspondent confirmed the value of Adrenoxyl in providing a dry field for the surgeon and in shortening the duration of the operation.

Packs

Ampoules: Boxes of 6 and boxes of 50.
Each ampoule contains 0.75 mg. of adrenochrome monosemicarbazone dihydrate.

Tablets: Tubes of 25 and bottles of 500.
Each tablet contains 2.5 mg. of adrenochrome monosemicarbazone dihydrate.

The best results are obtained when both tablets and ampoules are used.

HORLICKS LIMITED

Pharmaceutical Division Slough Bucks

Literature and samples are available on request to the Medical Information Dept.

FOR THE MOST **RAPID** AND **DECISIVE ATTACK** AGAINST THE **PULMONARY COMPLICATIONS** OF INFLUENZA

CRYSTAPEN TRADE MARK
FAST-ACTING PENICILLIN

In forestalling or treating pulmonary infections, the use of fast-acting penicillin in large doses is the recommended practice[1]. This is precisely what Crystapen (soluble sodium penicillin Glaxo) provides. It is the antibiotic preparation that kills bacteria swiftly, safely, and surely.

CRYSTAPEN INJECTION *Bottles of 5 and 10 mega (buffered or unbuffered) Lower potencies are available in unbuffered form*

1. Brit. Med. J. 1957, 2, 972.

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Subsidiary Companies or Agents in most countries.

23

Whichever way you take it . . .

BY MOUTH — *as most patients do*

BY RECTUM — *when there is severe nausea and vomiting early in the attack*

Cafergot

BY **SANDOZ**

aborts the attack of migraine in more than 80% of cases

TABLETS — 1 mg. Ergotamine Tartrate B.P.
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SUPPOSITORIES — 2 mg. Ergotamine Tartrate B.P.
100 mg. Caffeine B.P.
0.25 mg. total alkaloids of belladonna
100 mg. *iso*butylallyl barbituric acid

Sandoz Products Limited

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REMEMBER POPPY DAY

In infections of the genito-urinary tract

Reports on the use of 'Sulphatriad' in genito-urinary tract infections confirm its value in pyelonephritis of children and adults, in pyelitis of pregnancy, as a prophylactic when an indwelling catheter is required and for patients with loss of bladder control due to diseases of the central nervous system. In these conditions, as in many other sulphonamide-susceptible infections, 'Sulphatriad' is the preparation of choice. PRESENTATIONS: as 0·5 gramme tablets and as a palatable suspension. Each tablet or 3·6 c.c. (approx. 1 teaspoonful) of suspension contains: sulphathiazole 0·185 gramme, sulphadiazine 0·185 gramme, sulphamerazine 0·13 gramme. Detailed information is available on request.

'SULPHATRIAD'
trade mark COMPOUND SULPHONAMIDES brand
MANUFACTURED BY M&B MAY & BAKER LTD

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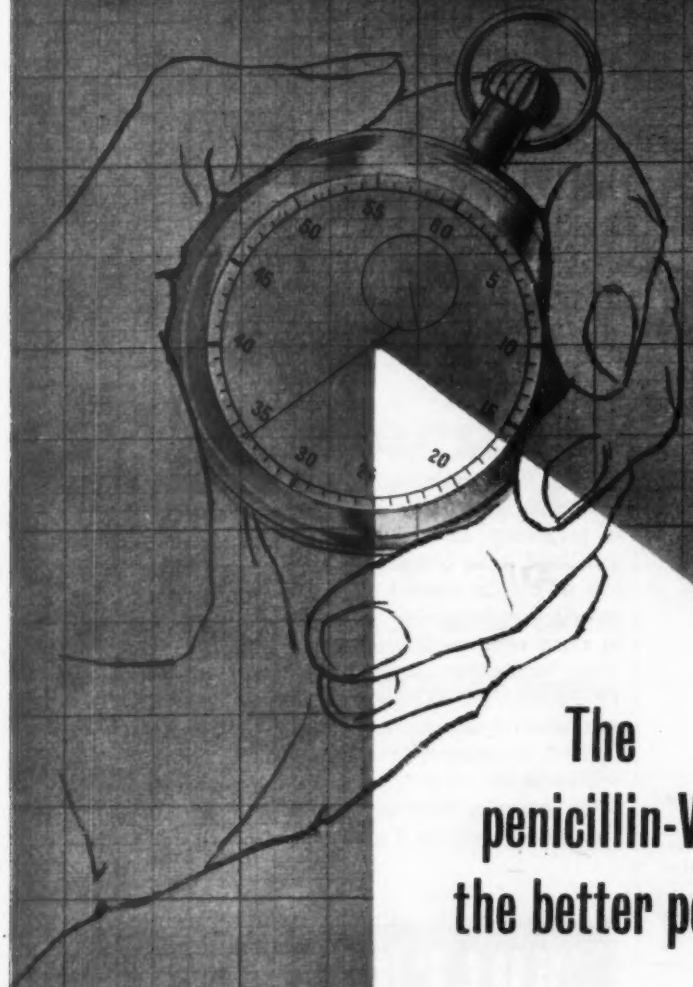
DISTRIBUTORS PHARMACEUTICAL SPECIALITIES (MAY & BAKER) LTD · DAGENHAM

Calcipen-V

CALCIUM PENICILLIN V



The penicillin-V with the better performance

* more soluble than the free acid
* produces higher blood levels
* quicker onset of action

Literature and further information gladly sent on request

BOOTS PURE DRUG CO. LTD., NOTTINGHAM, ENGLAND

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A H

"... When all aloud the wind doth blow,
And coughing drowns the parson's saw,
And birds sit brooding in the snow
And Marion's nose looks red and raw ..."

Act V. Sc. II "Love's Labour's Lost" by
William Shakespeare.

Effective decongestant therapy

PIRIEX

Liquefies tenacious sputum and aids its prompt removal

Each teaspoonful of Piriex contains 2 mg. Piriton (chlorpheniramine) maleate, 100 mg. ammonium chloride B.P. and 44 mg. sodium citrate B.P. Supplied in bottles containing 4 fluid ounces and 2 litres.

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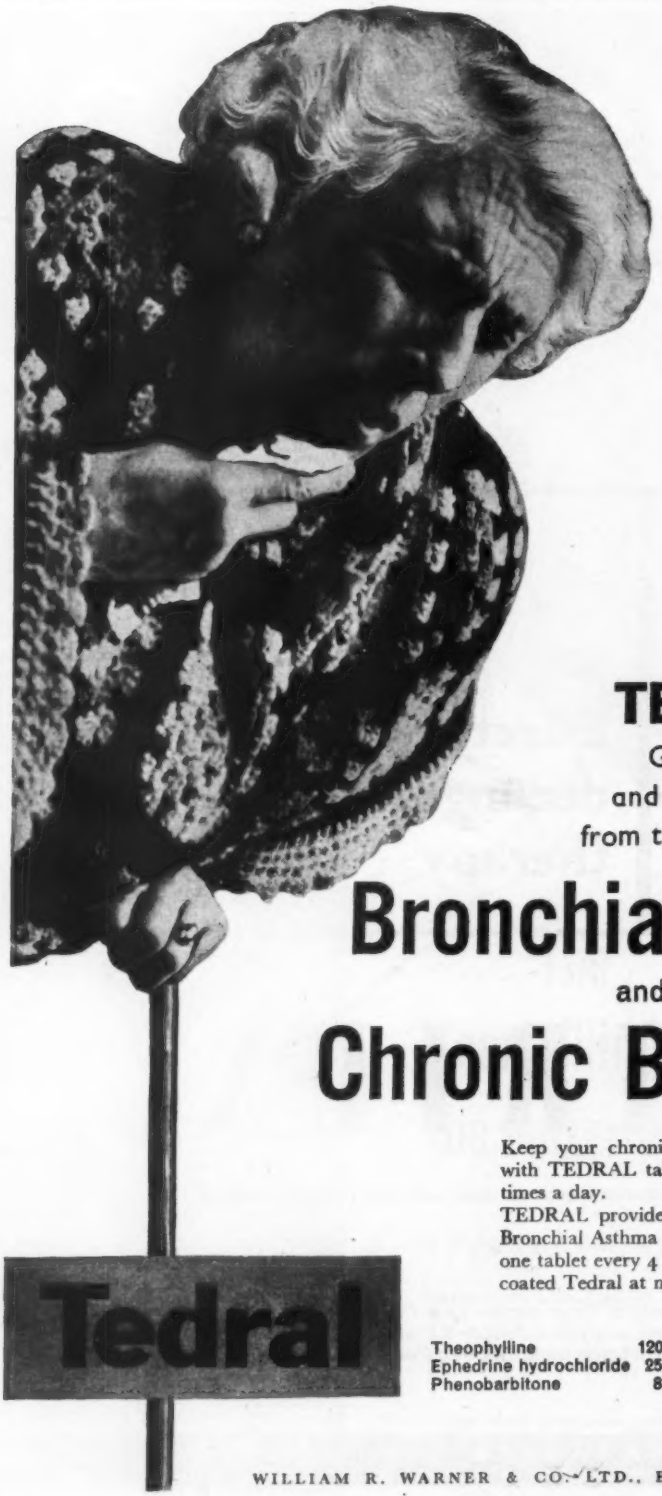

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TRADE MARK

Gives rapid
and lasting relief
from the symptoms of

Bronchial Asthma
and
Chronic Bronchitis

Keep your chronic bronchitic patients up and about with TEDRAL taken prophylactically one tablet four times a day.

TEDRAL provides 24 hours protection to your aged Bronchial Asthma and Chronic Bronchitic patients with one tablet every 4 hours during the day and one enteric coated Tedral at night.

Theophylline	120 mg. (2 gr.)
Ephedrine hydrochloride	25 mg. (⅜ gr.)
Phenobarbitone	8 mg. (⅛ gr.)

WILLIAM R. WARNER & CO. LTD., EASTLEIGH, HAMPSHIRE.

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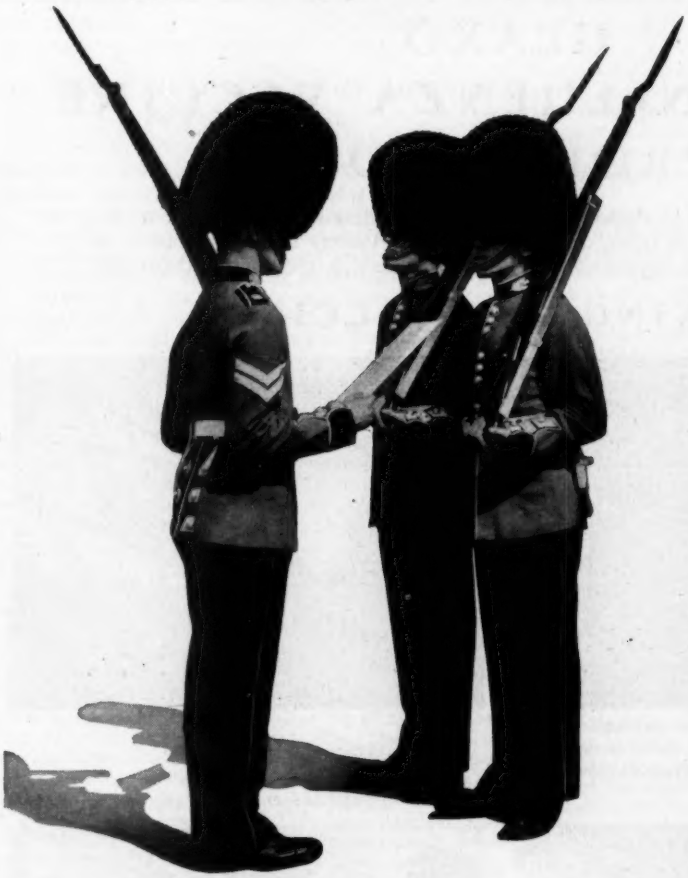


The order of the day...

'LANOXIN' *for maintenance therapy*

It never varies in potency.

It is taken each day, not intermittently.

Over-digitalisation quickly subsides because of rapid excretion.

'LANOXIN' BRAND *for unfailing control*

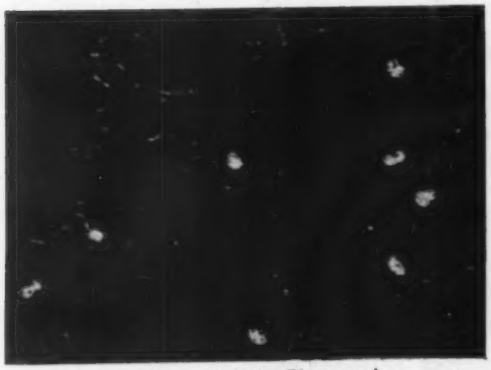
DIGOXIN

BURROUGHS WELLCOME & CO. *(The Wellcome Foundation Ltd.)* LONDON

GLAXO
ASIAN INFLUENZA VACCINE
PRODUCTION

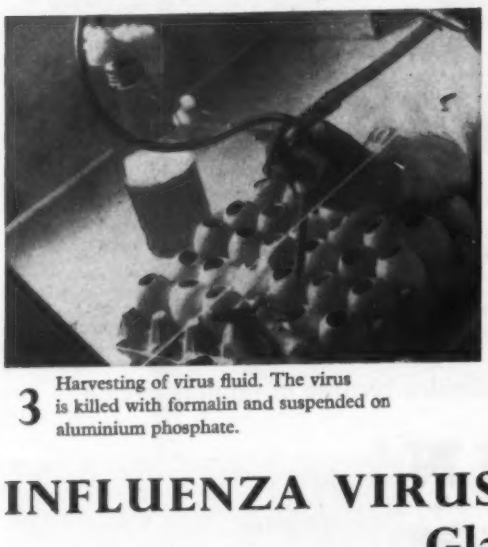
Priority production of an Asian influenza vaccine is going on at two Glaxo units. Initially this product is being distributed by the Ministry of Health but it is hoped shortly to make supplies available towards meeting prescription demands.

MAKING THE VACCINE

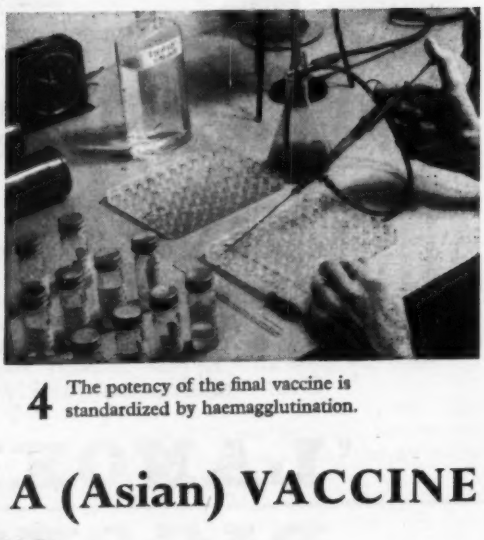


1 The virus from which the Glaxo vaccine is prepared. Influenza Virus A (Asian strain) designated A/Singapore/1/57. Photomicrograph of particles x 34,000.

2 Inoculation of fertile hens' eggs with the virus.



3 Harvesting of virus fluid. The virus is killed with formalin and suspended on aluminium phosphate.



4 The potency of the final vaccine is standardized by haemagglutination.

INFLUENZA VIRUS A (Asian) VACCINE
Glaxo

1 cc. ampoules in boxes of six

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Subsidiary Companies or Agents in most countries

THE CHANGING PATTERN OF SURGERY*

Sir CECIL WAKELEY

Bt., K.B.E., C.B., D.Sc., LL.D., F.R.C.S.

CONSULTING SURGEON TO KING'S COLLEGE HOSPITAL, LONDON

PERHAPS the earliest surgical record is that known as the "Edwin Smith papyrus", brought from Luxor by Edwin Smith in 1872, translated in 1922. It is the work of a skilled surgeon of about the year 1700 B.C. but appears to have been based on an older document. The writer was methodical in his diagnosis and treatment and his method of reduction of a dislocated lower jaw is still used. He used wooden splints and his wounds were closed by adhesive plaster. He directs that the pulse should be counted after an injury to the head to ascertain the condition of the heart; and he notes that injury of the brain was sometimes followed by loss of speech and by paralysis of the limbs. Aneurysms are mentioned. It would seem that this record was that of the combined knowledge of a school of Egyptian surgery, since it would appear too extensive for the experience of an individual.

This very early period of scientific surgery was followed by a retrograde one when faith was placed in charms and amulets rather than in precise knowledge. In India too there appears to have been a period of scientific surgery about the year 1000 B.C., also followed by a luxuriant growth of charms and invocations. But in spite of this, considerable progress was made—plastic operations were numerous and successful, and couchings for cataract were common.

Greek surgeons, following the teaching of Hippocrates in the 5th century B.C., excelled in the observations of facts; and their rules of cleanliness could not be bettered. They filtered or boiled the water used in washing of wounds and it was expected that wounds would heal by first intention. Diseases of the eye were studied and certain operations undertaken; but amputations were rarely attempted. No distinction was made between medicine and surgery until nearly a thousand years later.

The surgery of the Roman period is well documented, and excavations at Pompeii and Herculaneum brought to light a wealth of surgical instruments designed for a variety of operations, many of them differing little in design from those still in use. Until the bombing of the Hunterian museum at the Royal College of Surgeons in 1941, among the Historical Collection was an artificial limb, made of wood ensheathed by bronze plates, used by a Roman in about 300 B.C. In the post-Christian era, the works of Celsus (25 B.C.–A.D. 50), Galen (A.D. 130–200), Alexander of Tralles (A.D. 525–605), and others give evidence of the advances in human surgery and reveal the fact that the army medical service of the Roman legions was well organised. Radical cures of hernia was undertaken; stones were extracted from the bladder; arteries were tied; amputations by the circular method were performed, and the trachea was opened. Anatomy was practised as a science, clinical teaching was given, and surgical writings were available in libraries. The decline of the Roman Empire, however, brought an end to this period of enlightenment not only in surgery but in all subjects, and the eclipse lasted for more than two hundred years. But although the practice of surgery declined, the written word was still revered.

* * *

The history of hospitals can be traced back to the 6th century B.C. The temples of Asclepios in Greece were well known as centres of healing from 500 B.C. Baths were attached to them, and massage, bleeding, and other operations were performed. In Rome there were large and well-equipped hospitals for the poor and for slaves as well as for the better classes. Much was written on the type of building, cleansing, decorating, and cookery of these institutions; but with the decline in learning these too fell into disuse.

* * *

With the renaissance of learning, surgical knowledge began to make advances again. One of the best-known schools of this period, round about A.D. 1000 was that of Salerno, and its renown was soon world-wide. Women as well as men were freely admitted, and pupils served for seven years and were examined in their knowledge of Hippocrates, Galen, and the Arabic writers before they were licensed to teach. The Duke of Normandy, eldest son of William the Conqueror, was treated there in 1098 for a fistula resulting from an arrow wound in the First Crusade. One of the finest works of this period was the *Pantegni* of Hali-ibn-Al Abbas, which described the method of removing barbed arrows, the closing of wounds by sutures, the tying of arteries, and the refracture of badly set broken bones, and deplores the divorce of surgery from medicine and the neglect of the study of anatomy. This treatise was translated into Latin by Constantinus Africanus in the 11th century and many later works on practical surgery were based on it. Universities now began to be established where medicine and, to a lesser extent, surgery formed a part of the training. The continual wars produced a remarkable number of surgeons, in Italy, France, Holland, and England. Their knowledge was gained on the battlefield and their writings give a fine account of the state of surgery at the time. Amongst these are William of Salicet (1201–77) who, in his *Chirurgia*, written in 1275, recommended the knife instead of the cautery, advised suture of divided nerves and tendons, and gave directions for the repair of a wounded intestine. One of Salicet's most distinguished pupils was Guido Lanfranchi, of Milan. His treatises on surgery were translated into French, Dutch, and English. He maintained that surgery was an essential part of medicine and states "I say, however, that no man can be a good physician who has no knowledge of operative surgery, a knowledge of both branches is essential".

In the 14th century Henri de Mondeville was one of the leading surgeons. In his opinion

> "A surgeon ought to be fairly bold. He should not quarrel before the laity and although he should operate wisely and prudently he should not undertake any dangerous operation unless he is sure that it is the only way to avoid a greater danger. His limbs, and especially his hands, should be well shaped, with long, delicate and supple fingers which must not be tremulous. He ought to promise a cure to every patient but should tell the parents or friends if there is any danger. He should refuse as far as possible all difficult cases and never interfere with desperate ones. He may give advice to the poor for the love of God only, but the rich should be made to pay well. He should neither praise himself nor blame others and he should not hate any of his colleagues. . . . The surgeon's assistants must be loyal to their master and friendly to his patients. They ought not to tell the patient what the surgeon says unless the news is pleasant and they should always appear cheerful. They should not be constantly grumbling, because this inspires fear and doubt in the patient".

Guy de Chauliac, in the same century, was the first to write a comprehensive textbook of surgery and this too was translated into many languages, including English (published 1542) He recommended the use of ointment in the treatment of wounds and as a consequence suppuration came to be regarded as a normal and necessary process in healing.

In England at this period John Arderne was the foremost surgeon, and, like so many of his renowned pre-

* Presidential address delivered before the Medical Society of London on October 14, 1957.

decessors and colleagues, he had gained much of his experience in war—he is said to have been present at the battle of Crécy in 1346. He devised a new operation for fistula-in-ano, the subject of an illustrated treatise published in 1910 from a manuscript completed by Arderne in 1376.

* * *

It was in the 14th century, when surgical knowledge was increasing in line with the general renaissance of learning, that surgeons sought to find means to protect their rights, especially as they became more widely separated from the physicians. Universities gave no special degree in surgery, and the licence to practise surgery that was sometimes granted carried no special privileges. In many of the larger cities in Europe; therefore, the surgeons formed companies or colleges of their own. One of the first of these was the College of St. Come, in Paris, organised in the year 1350. Courses of study were arranged and there were various grades—masters, licentiates, bachelors, and apprentices.

In London at the same period a similar body was formed, consisting for the most part of surgeons who had served in the Hundred Years' War. The membership at first was only small, and the individual seemed to have treated only the wealthier citizens, churchmen and nobility. This Fraternity of Surgeons kept a separate existence until 1493 when it entered an informal alliance with the Company of Barbers, a union made absolute in 1540 when Henry VIII granted a charter uniting the Guild of Surgeons and the Company of Barbers into a single corporate body. Similar companies were formed in Edinburgh, Dublin, Newcastle upon Tyne, and other cities.

* * *

The almost uninterrupted succession of wars during the next few centuries undoubtedly led to an appreciable increase in surgical knowledge, and, as we have already noted, many of the greatest surgeons gained their experience on the battlefield. It often happened, however, that so constant was the need for their services that no leisure remained to record for the benefit of posterity the fruits of their experiences. Such writings as do exist from this period, however, are of great interest and importance. In 1460, for instance, Heinrich von Pfolspeundt, a Bavarian army surgeon, wrote on the bandaging and treatment of wounds. These were mainly arrow wounds; but this work, which remained in manuscript until 1868, is interesting as containing the first brief reference to the extraction of bullets and to plastic surgery of the face. Jerome of Brunswick published in 1497 a surgical work called, in its English version (1525), *The Noble Experience of the Virtuous Handiwork of Surgery*, containing a description of gunshot wounds and teaching that they were not poisoned. This was one of the first illustrated medical works.

Ambroise Paré (1510–90) was perhaps the greatest, the most prolific, and the most amusing of the army surgeons. During his lifetime France was engaged in wars against Italy, Germany, and England, as well as in civil war. There was no organised army medical corps, and the surgeon accompanied the troops, giving attention when required and receiving what rewards the leaders were willing to give. Paré gives some of his experiences at war in his *Voyages faits en divers lieux*. He was forced to apply such remedies as were available, and he tells how at first he could not sleep, fearing that he would find his patients dead in the morning. Paré served in Turin, in Brittany, and in Germany. He tells how one of his patients was so mutilated that his comrades had already dug a grave for him. "I did him the office of physician, apothecary, surgeon and cook", he says. "I dressed him to the end of his case, and God healed him". Speaking of pyæmia and wound infection Paré pointed out that the surgeon was not to be blamed for the failure of his treatment when infection supervened. "If anything succeed unprosperously in so great malignancy of wounds the chirurgeon is not to be blamed, for it were a crime to fight against God and the air wherein the hidden scourges of the divine justice lie hid." He found that gunshot wounds did not need to be cauterised, as they were not poisonous; and instead he applied a dressing of yolk-of-egg, oil of roses, and turpentine. He advised against using the cautery to stop bleeding after amputation—"Wherefore I most earnestly entreat all surgeons that, leaving this old and too, too cruel way of healing, they would embrace this new, which I think was taught men by the special favour of the sacred Deity, for I learnt it not of my masters, nor of any other, neither have at any time found it used by any". This new way was to ligature the vessels—another two hundred years was to pass before this method was to become accepted in England.

With the increase of mutilations consequent on more devastating weapons of war, interest in plastic surgery grew. The Brancas of Sicily, a family of itinerant surgeons of the 15th century, introduced the method of using the skin of the forehead, cheek, and arm to restore mutilated lips and ears; and in the following century Gaspare Tagliacozzi of Bologna, invented rhinoplasty. Curiously enough, this procedure was strongly condemned by the Church because it appeared to interfere with the will of the Almighty; and the operation fell into disuse until the 19th century.

This period was perhaps the beginning of specialisation in surgery. The treatment of stone in the bladder, a very common complaint, was most often entrusted to itinerant lithotomists. One of the best-known of these was Pierre Franco, a surgical genius of the 16th century, the first to perform suprapubic lithotomy. He invented strong forceps by crushing the stone so that the fragments might more easily pass through the wound. He wrote a treatise on hernia and he was the first to describe the operation for strangulated hernia. In the following century Frère Jacques, a Frenchman who assumed the dress and wandering life of a friar, practised lateral lithotomy, an operation which is often associated with his name. He took no fees, and this fact and his success aroused the jealousy of the more orthodox surgeons.

* * *

In England, in the 16th century, the name of Thomas Vicary is prominent. He was surgeon to the King and first master of the new Company of Barber Surgeons. He and some of his colleagues had been instrumental in securing this union, and they then proceeded to organise a course of systematic teaching for all who intended to practise as surgeons. One of these colleagues was John Banester who strove hard to reunite surgery and medicine, which union, he declared, would be to the benefit of both. "Some of late have fondly affirmed that the chirurgeon hath not to deal in physic", he says. "Small courtesy it is to break faithful friendship . . . for the one cannot work without the other, nor the other practise without the aid of both." A contemporary Scottish surgeon, Peter Lowe, wrote what is generally thought to be the first textbook of surgery to be written in English—*A Discourse on the Whole Art of Chirurgie*, published in 1596—though William Clowes and Thomas Gale had each published accounts of their practice previously.

At the beginning of the 17th century naval surgery gained some attention in England. John Woodall, surgeon-general to the East India Company, published in 1617 his *Surgeon's Mate* which became the official textbook which every naval surgeon was obliged to carry with him. This is full of common sense and his treat-

ments were easy of application. He is remembered for his advocacy of fruit and vegetable juices as a preventive of scurvy, a remedy that antedated James Lind's similar recommendation (1753) by more than a hundred years. Richard Wiseman (1622–76), like Woodall, gained much of his surgical experience at sea, serving during the Commonwealth in the Dutch and later in the Spanish navies. After the Restoration he was appointed serjeant-surgeon by Charles II. His *Severall Chirurgicall Treatises* is considered to be the greatest work on surgery in England that had appeared so far. It made no attempt to cover the whole field of surgery but dealt with special subjects in the light of his own experiences. It was written not for students but for his fellow surgeons, and it probably helped to raise the status of the surgeon, then subservient to that of the physician. Wiseman's case-histories are detailed and precise. Among numerous interesting cases of both military and civil surgery he described the treatment of an aneurysm in the right arm. He opened the sac of the aneurysm, turned out the clot, and ligatured the artery immediately above the sac.

The death of Richard Wiseman in 1676 ends a period of surgical history in England, and for some years surgery again suffered an eclipse. Social conditions were at a low ebb; but after the turn of the century it began to be realised that it was economically desirable that the sick, and especially the sick poor, should have proper care. This was the time of the founding of many of our well-known hospitals, supported by voluntary contributions: the Westminster Dispensary, now Westminster Hospital, in 1719; Guy's in 1725; Edinburgh Royal Infirmary in 1729; St. George's Hospital in 1734; The London Hospital in 1740; The Middlesex Hospital in 1745. Surgery began a new era when hospitals became more numerous, for opportunities and facilities were at hand to experiment with new operations and treatments and to improve on old methods. The itinerant practitioners, often with no training and usually mere quacks, began to lose their custom, and it was now that the foundation of scientific surgery was laid.

* * *

The two leading English surgeons of the middle years of the 18th century were William Cheselden and Percivall Pott. The former, famous as a lithotomist, was a surgeon at St. Thomas'; he frequently completed the operation and it was said that his record time was twenty-four seconds. He modified Frère Jacques' operation of lateral lithotomy and reduced the mortality to 17%—a remarkable achievement in pre-anaesthetic days. He was one of the first to perform iridotomy and was able to restore the sight of a blind boy by constructing an artificial pupil. In speaking of his experiences in operating, he says "If I have any reputation in this way I have earned it dearly, for no one ever endured more anxiety and sickness before an operation, yet from the time I began to operate all uneasiness ceased and if I have had better results than some others I do not impute it to more knowledge but to the happiness of a mind that was never ruffled or disconcerted and a hand that never trembled during any operation". For his skill as an ophthalmic surgeon Pope coupled his name with that of the leading London physician, Richard Mead:

> "I'll do what Mead and Cheselden advise
> to save these limbs and to preserve these eyes."

Following Cheselden as one of the leading London surgeons was Percivall Pott, and it was probably due to these two that surgery ceased to be regarded as an inferior branch of the medical profession and the surgeon and the physician came to be considered as social equals. Pott had an extensive surgical practice in the third quarter of the century and numbered Samuel Johnson and David Garrick among his patients; but he was also a pioneer in the systematic teaching of medical students and gained a great reputation both as a lecturer and for his writings. Pott published his observations in small pamphlets costing 1s. 6d. His books are thoroughly practical in their advice. He wrote first on ruptures—

> "A disease which if judiciously and honestly treated from the first can never be of much profit to a surgeon; it requires very little attendance and neither external application nor internal medicine; though the reduction of the gut and the application of a proper bandage are necessary, yet this is, in general, so soon and so easily accomplished, that it must be obvious no great emolument can from thence be derived."

His next important work was on *Fractures and Dislocations*, in which he advocated the relaxation of the muscles. Among his many other pamphlets the most interesting is his *Observations on the Nature and Consequences of those Injuries to which the Head is Liable from External Violence*. It contains vivid accounts of the cases, due both to accidents and violence, which came under his care.

* * *

Having benefited from the teaching of both Cheselden and Pott, it is easy to understand how John Hunter came to be regarded as the founder of scientific surgery in England. It was John Hunter who rescued surgery from its threatened isolation, pointing out the importance of a precise knowledge of anatomy—normal, morbid, and comparative. Not content to give his patients the benefit of his surgical skill, he endeavoured to find the causes of the afflictions that brought them into his care. He realised only too clearly that the mere adroitness acquired by long practice in operating was not enough. Surgery at its best was a last resort and he was a poor surgeon whose knowledge lay only within its bounds. Hunter's influence during his lifetime was appreciable, for his fame brought him pupils from all over the Western world but what is the more remarkable is the fact that that influence is still apparent today. Much stress has been laid on the fact that Hunter was a poor lecturer. That may have been so; but so great was the enthusiasm aroused for his ideas and ideals that many of those who enjoyed the privilege of attending his classes became in turn the leading exponents of this new scientific surgery. Abernethy, Astley Cooper, Cline, Hey of Leeds, Physick in America, Lauth in Germany, and dozens of others, spread his doctrines; and a third and fourth generation, including such notable names as Lawrence, Paget, and Lister, helped to establish modern surgery upon Hunter's safe foundations.

* * *

The advent of the age of antiseptic surgery, which resulted from the work and teaching of Lister, gave a tremendous impetus to the advance of surgery. It is true to say that Lister more than any other surgeon gave to modern surgery its present important place and enabled surgeons from all over the world to perform operations safely. It is hard for us today to visualise the state of affairs in our hospitals in the pre-Listerian times. Every operation wound became infected; a large number of cases died of hospital gangrene; and the profession spoke of "laudable pus" because its appearance was considered necessary to the healing of wounds.

Within the last two decades surgery has received valuable ancillary assistance from the enormous progress in X-ray techniques both diagnostic and therapeutic. The surgeon of today would be severely handicapped if it were not for the help he receives from his radiological colleagues. In all the many and varied branches of surgery, X-ray examinations play no uncertain part in the diagnosis and treatment of disease.

The two world wars, especially the second, played an important part in the advance of surgery. The first world war did much to establish orthopædic surgery as a specialty. In this country the name of Robert Jones

stands out clearly as the person who did more than any other to place orthopædic surgery on a proper footing. Jones' background was important: he acted as assistant to his maternal uncle, Hugh Owen Thomas, the inventor of the Thomas splint. Robert Jones was a general surgeon in Liverpool until 1905 when he decided to specialise in orthopædic surgery. Liverpool was well situated to become the mecca of orthopædic surgery in England because it was an important disembarkation centre to which so many American surgeons came when they visited this country. He always welcomed the Americans and was able to show them his methods of treating fractures and deformities. It is true to say that in his early years in which he practised orthopædic surgery Robert Jones was better known in America than in England. R. W. Lovett (1859–1924), of Boston, and John Ridlon (1852–1936), of Chicago, were his chief American admirers.

In the first world war he made a name as a great administrator, being appointed director-general of military orthopædics with the rank of major-general, A.M.S., and a member of the War Office Advisory Board, and finally became consultant orthopædic surgeon to the Ministry of Pensions. After the war orthopædic centres were opened in many places and the status of orthopædic surgeons was so well established that departments were created for them in all large hospitals. It was due to Robert Jones that this progress took place. During the second world war orthopædic surgeons played an important part in the treatment of casualties. The end-results from wounds of the extremities were better than ever before. Today orthopædic surgery forms one of the largest branches of surgery; it has an association of its own and has its own journal.

In the field of thoracic surgery, which has made such strides during the present half-century, the name of Arthur Tudor Edwards stands out very clearly. Having a good sound background in general surgery, he devoted himself to the specialty. He served in the first world war and having seen the work of Pierre Delbet and George Gask he explored successively the surgery of pulmonary tuberculosis, bronchiectasis, tumours of the mediastinum, and tumours of the lung. There can be little doubt of the part played by Tudor Edwards in the pioneer work which placed British thoracic surgery in the forefront of the world. It was not only his teaching or writings, and they were many, which made him an international figure: it was also his operating, for he was an operator of supreme skill and fascinating technique. His work in this field was disseminated the world over and as a result this specialty has made great advances during the last decade. His name will go down in history as the founder of modern thoracic surgery in England.

During the early part of the 20th century neurosurgery as we know it today was born, and the man who really did more than any other to blaze the trail of this new branch of surgery was Harvey Cushing, of Boston, whose British contemporaries were Victor Horsley and Percy Sargent. Probably no surgeon either before or since has had such a wonderful postgraduate training, for Cushing studied widely in America, Switzerland, and Italy, and in England under Charles Sherrington. This extensive surgical background enabled him to develop a technique which allowed every part of the brain to be explored. He served in France during the first world war and his experiences are given in his book *From a Surgeon's Journal*. But Cushing will always be remembered as a writer of repute; his *Life of Sir William Osler* was a great success and was awarded the Politzer prize as the best biography of the year. It is given to few men to have a society called after their name in their lifetime, as happened to Cushing. The Harvey Cushing Society held a party on 8th April, 1939, to celebrate his 70th birthday.

Like so many other branches of surgery, neurosurgery came into its own during the second world war, and the main factors responsible for its spectacular advance were adequate blood-transfusion, the use of penicillin, and the control of hæmorrhage by means of diathermy. After the war neurosurgical units were set up in all important surgical centres and as a specialty it has steadily progressed.

The discovery of penicillin by Fleming and its clinical application by Florey were the outstanding events in surgical progress in the past half-century.

* * *

We are now living in the Golden Age of surgery, and this is the result of five very important legacies. These legacies were the result of the second world war when so many casualties were under treatment and many different forms of treatment were tried and assessed. The first legacy was a better appreciation of the nature of shock and its treatment, which had been facilitated by the development of blood banks, and the use of dried plasma and dextran. The second is that, owing to biochemical researches, we have a better knowledge of the body's need of fluids and salts. Thirdly, the electrolyte balance and the real meaning of nutrition in surgery are better understood. Fourth, the further development of antibiotics is ever increasing the safety of operations. The last legacy and by no means the least is the tremendous advance in anæsthesia, especially in refrigeration techniques. Hypothermia is a form of anæsthesia which has come to the fore during the last few years? but it must be admitted that its use is limited and it should be only undertaken in specially equipped centres where careful control is available. Although there are three methods for inducing hypothermia in clinical practice, yet surface cooling is the only one which has been extensively used. Probably the most dramatic success of hypothermia is in operative treatment of intra-atrial septal defects. The great advantage of this technique is that it allows the surgeon to close the defect under direct vision.

Hypothermia allows intracardiac surgery to be performed with a low mortality.

Several branches of surgery had made spectacular advances in the last decade, but probably the surgery of the heart and great vessels was in the forefront of this advance. The use of the heart-lung machine, which could temporarily take over the oxygenating function of the heart, has made many of the advances of cardiac surgery possible.

One of the best Acts of Parliament in recent years was the Corneal Graft Act, which allows for the removal of the cornea from a dead person and its use in the living. Several hundreds of blind people are being given back their sight by its operative procedure. What is wanted today is a comprehensive Act which would allow the removal of any tissue from a body within a few hours of death for the replacement of diseased and worn-out tissues and organs in living persons. We in Britain are far behind the United States, France, and Russia, where skin, bone, cartilage, nerve, and blood-vessel banks are in everyday use. However, in spite of the fact that such banks are not yet legal in this country, it is pleasing to note that owing to the energy, skill, and teaching of Prof. Charles Rob, more and better blood-vessel grafting is carried out in this country than in any other. It is surely not too much to expect in the future that replacement of organs such as the kidneys and the heart will be possible.

We are probably on the verge of very great advances in the treatment of cancer and it may well be that some of the mutilating operations now performed for this dread disease will no longer be necessary, and a cure may come from some pharmacological preparation. Who knows?

TREATMENT OF INOPERABLE CANCER OF THE BRONCHUS
BY MEGAVOLTAGE X-RAY THERAPY

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IN cancer of the bronchus at an early stage surgery offers the best chance of a cure, but out of the total number of patients who develop the disease only a small proportion can be operated on. For the many patients with inoperable growths, radiotherapy may give useful palliation in a high proportion of cases (Blanshard 1955, Churchill-Davidson 1955) and the chance, admittedly small, of survival for five years or more (Dobbie 1944, Smithers 1955, Smart and Hilton 1956).

In most of the published series the radiotherapy has been given by 200–250 kV X rays.

But X rays generated at over one million volts, because of differences in their physical characteristics, have certain advantages in the treatment of deep-seated growths:

(1) The greater energy and penetration of the beam delivers to deeply placed tumours a higher dose than is possible with conventional therapy.

(2) The maximum "build-up" of secondary scattered electrons, which cause the local radiation effects, takes place at some distance beneath the skin, which receives only a fraction of the maximum applied dose. As a result the skin and subcutaneous tissues sustain less damage than with 250 kV X rays, where the maximum effect is on the surface.

(3) Because the secondary scatter radiation is mainly in a forward direction, there is reduced scatter outside the main beam with less damage to adjacent tissues.

(4) The absorption in bone lying in the field of radiation is considerably less and the screening effect of bone is reduced. The tumour can thus be given a cancericidal dose with less damage to the normal tissues than occurs with 200–250 kV X rays.

There are now several machines in clinical use in this country for the production of X rays of an equivalent energy of over one million volts. We report here the results of treatment in patients with inoperable carcinoma of the bronchus treated by the M.R.C. 8-million-volt linear accelerator installed at Hammersmith Hospital. The machine and the techniques of treatment have already been described (Newbery and Bewley 1955, Morrison et al. 1956). One advantage of this design of megavoltage machine, particularly when treating an ill patient, is the high dose-rate, allowing treatment to be given in two or three minutes compared with fifteen to twenty minutes on a conventional-therapy machine.

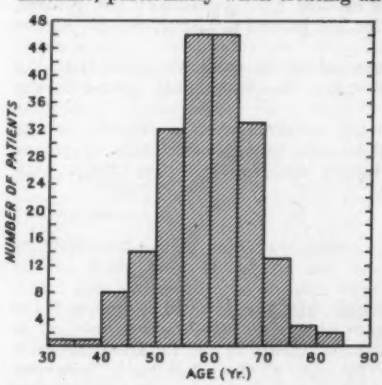

Fig. 1—Age-incidence of carcinoma of bronchus in 199 patients.

The Patients

From September, 1953, to September, 1956, 586 patients were referred to the radiotherapy department of this hospital for treatment of carcinoma of the bronchus. They attended a clinic at which the method of treatment was decided in consultation by a physician, a surgeon, and a radiotherapist. A selected group of 209, who presented with an inoperable tumour but had no evidence of disease outside the chest, were considered able to stand a radical course of X-ray therapy. Of these patients 10, who rapidly deteriorated in their general condition, had to have their treatment curtailed. The remaining 199 who completed the course are analysed here.

Of these 199 patients, 187 (94%) were men and 12 (6%) were women. The average age was 59·5. The age-incidence showed a peak in the 55–65 age-group (fig. 1).

The Disease

We tried to obtain histological proof of malignancy in as many cases as possible by bronchoscopy, drill biopsy, or examination of the sputum. The histological analysis is:

Histology	*No. of cases*
Squamous carcinoma	96 (48%)
Anaplastic and oat-cell	56 (28%)
Adenocarcinoma	2 (1%)
Other:	
Carcinoma in situ	1 (0·5%)
Malignant cells in sputum	1 (0·5%)
Negative histology or no biopsy	43 (22%)
Total	199

Site of Tumour

Table I shows the site of the primary tumour in the proved and unproved cases. It will be noted that almost half of the left upper-lobe lesions were unproved. This is probably because of the technical difficulty of bronchoscopic biopsy of tumours at this site.

TABLE I—SITE OF TUMOUR

—	Right main bronchus	Right upper lobe	Right lower lobe	Right middle lobe	Left main bronchus	Left upper lobe	Left lower lobe	Total
Proved	16	39	25	4	17	26	29	156
Not proved	..	9	3	1	7	21	2	43
Total	16 (8%)	48 (24%)	28 (14%)	5 (3%)	24 (12%)	47 (24%)	31 (16%)	199

Extent of Disease

With megavoltage therapy a larger volume of tissue can be fully irradiated than is possible with 250 kV X rays, and no patient was considered unsuitable for treatment because of the size of the primary lesion. Evidence of spread of the disease to the mediastinum was also not a contraindication to this form of treatment.

Table II shows the incidence of mediastinal involvement analysed according to the histological type. The diagnosis of the mediastinal involvement was based on: (1) clinical evidence (e.g., recurrent laryngeal paralysis); (2) radiological evidence; (3) bronchoscopic evidence of a widened carina or bulging of the trachea or main bronchus as a result of pressure from enlarged nodes; and (4) direct evidence obtained at a previous thoracotomy.

It will be seen that the anaplastic tumours involved the mediastinum more often than the squamous tumours did.

The Treatment

The patients were treated in a sitting position in a chair specially designed to support the legs, arms, and head in a comfortable position which lessened the chance of

TABLE II—MEDIASTINAL SPREAD AND HISTOLOGY

—	Anaplastic	Squamous	Adeno	Other	Negative histology	Total
No spread to mediastinum	26 (46%)	64 (67%)	..	2	18 (42%)	110 (56%)
Spread to mediastinum	30 (54%)	32 (33%)	2	..	25 (58%)	89 (44%)

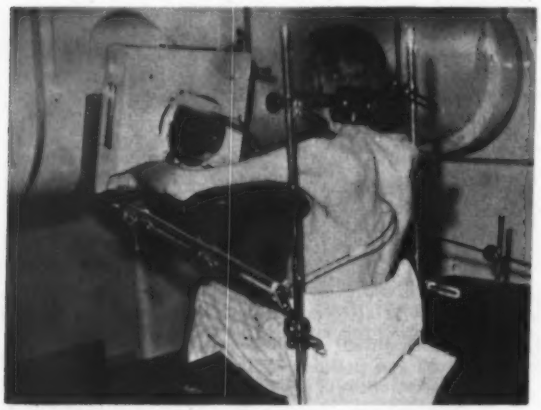

Fig. 2—Apparatus to maintain patient's position steady.

movement (fig. 2). The treatment was given on consecutive days, five days a week for four weeks. Where the patient's general condition permitted, the full course of treatment was given to the patient as an outpatient.

The position of the tumour and the volume of tissue to be irradiated were determined from radiographs. The whole opaque area shown on the X-ray films, with a surrounding zone of 2 cm. of apparently normal lung, was included in the field of treatment. This area, which might include collapsed lung peripheral to the tumour, was irradiated because of the difficulty of deciding the limits of the growth. The mediastinum was also included in the field of radiation except in peripherally placed squamous-cell tumours: when such tumours had shown no sign of mediastinal spread, only the primary tumours were treated.

The mean area used to treat squamous-cell tumours was 165 sq. cm. and to treat anaplastic tumours 205 sq. cm. It was difficult to decide on the optimum dose for tumours at this site, but we assumed that doses having a similar biological effect to those used at lower energies would be required. A mean tumour dose of 4500 rads was given in twenty daily fractions except where a field more than 200 sq. cm. in area had to be used, when the dose was reduced to 3600 rads. The dose prescribed at the beginning of treatment was never exceeded.

The patients were treated by two fields so arranged that the spinal cord and the opposite lung received only a small dose of radiation (fig. 3). The field positions were marked on the patient's skin, and a check radiograph was taken to ensure that the tumour was adequately included in the proposed field. Accurate alignment of the beam was achieved by the use of a front-and-back pointer arrangement indicating the entry and exit points of the X-ray beam.

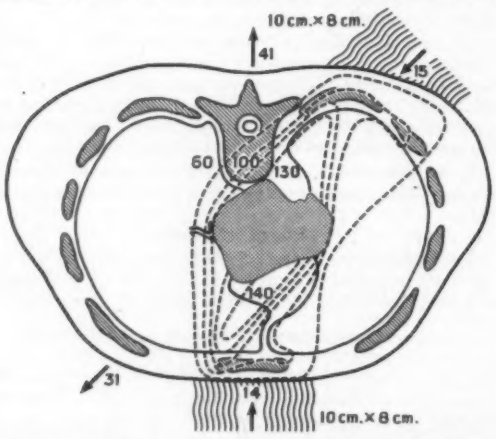

Fig. 3—Two non-opposed fields technique for irradiation of carcinoma of bronchus. Broken contours represent percentages of peak dose.

Immediate Effects

Most of the patients did not suffer any constitutional disturbance from the radiation. A few patients complained of tiredness with anorexia, but in none were the symptoms sufficiently severe to interrupt treatment. The only local effect was discomfort on swallowing, usually felt in the retrosternal region. Of the 199 patients 115 (58%) complained of discomfort, but in only 7 (3·5%) was this symptom severe enough to delay the completion of treatment. The dysphagia usually began during the third week, but in a few patients it was noted as early as the fourth day; occasionally it did not develop until treatment had been completed. The symptoms on an average lasted for nineteen days. There did not appear to be any correlation between the time of onset, the duration, and the severity of the dysphagia. It was thought that this symptom was caused by the direct effect of radiation on the œsophageal mucosa, and a mucosal reaction was noted in necropsy specimens. In cases of severe dysphagia there was radiological evidence of œsophageal spasm.

TABLE III—SURVIVAL

Month of treatment	No. of deaths	Still alive	No. at risk	Probability of living through month (%)	Survival (%)
1	0	..	199	100·0	100·0
2	7	..	199	96·5	96·5
3	15	1	191½	92·2	88·9
4	18	..	176	89·8	79·8
5	15	..	158	90·5	72·2
6	15	1	142½	89·5	64·6
7	23	..	127	81·9	52·9
8	11	1	103½	89·4	47·3
9	10	1	91½	89·1	42·1
10	12	1	80½	85·1	35·9
11	3	1	67¼	95·6	34·3
12	5	2	63	92·1	31·5

Results

The survival-rates are shown in table III, which has been compiled on the life-table method and shows the probability of surviving each month up to a year from the beginning of treatment. It will be seen that the six-month survival-rate is 64·6% and the one-year survival-rate 31·5%; 50% of the deaths had occurred at 7·4 months.

If the cases are divided into proved and not proved, the survival-rate for 156 proved is 28·3%, and for 43 not proved it is 34·9%.

The survival-rates given in table IV show that the prognosis is worse when the disease has spread to the mediastinum.

Table V shows the survival-rates in relation to the histology. It will be seen that patients with squamous cancer have a better survival-rate than those with anaplastic cancer.

Palliation

It is difficult to assess the value of the treatment in relieving symptoms and to decide how much of the general improvement can be attributed to the radiotherapy. The nursing care, the hospital regime, and the psychological effects of having an elaborate method of treatment may also contribute to the reported improvement (table VI). In spite of these influences, however, there is little doubt that many patients obtain considerable benefit from the therapy.

Late Effects

It has been known for many years that fibrotic changes may develop in the lungs after irradiation for breast and œsophageal carcinomata (Groover et al. 1922, Finzi 1925, Levitt and Phillips 1934). Similar changes have been noted in lungs irradiated for carcinoma (Engelstad 1937), but because of the poor prognosis in this disease most patients die before the gross changes develop. In the present series radiographs taken after the treatment were reviewed for evidence of pneumonitis or of lung shrinkage caused by the subsequent fibrosis. It is not possible to differentiate the changes of lung shrinkage due to normal reparative processes after the tumour cells have been destroyed by the radiation from those due to the effects of irradiation of the normal lung tissue.

Table VII shows the number of patients who had radiological evidence of lung shrinkage at different periods from the beginning of treatment.

It will be seen that most patients will develop radiological evidence of lung shrinkage if they live long enough. Fibrotic changes may not cause any symptoms; but, when severe, may be associated with an irritable cough and with dyspnœa, which is often progressive. The fibrotic lung is liable to recurrent infection, especially in winter.

TABLE IV—SURVIVAL-RATES AND MEDIASTINAL SPREAD

Survival	Spread to mediastinum	No spread to mediastinum
Six months	48/88 (54·5%)	78/110 (71%)
One year	15/86 (17%)	42/108 (39%)

TABLE V—SURVIVAL-RATE AND HISTOLOGY

Survival	Squamous	Anaplastic
Six months	64/94 (68%)	30/56 (53·3%)
One year	32/90 (35·5%)	9/56 (16·1%)

In a preliminary survey of patients with carcinoma of the bronchus treated with 250 kV X rays similar changes were seen in the long survivors, and there did not appear to be an increased risk with megavoltage therapy. It seems likely that modifications of the irradiation technique could reduce the extent of the fibrosis, and this aspect of the therapy requires further investigation.

Discussion

In view of the improved dose-distribution it is of interest to compare the results with those obtained by conventional methods. A similar group of patients treated at this centre by 250 kV X-ray therapy showed a one-year survival-rate of 24·4% compared with the figure of 31·5% with 8 million volts. But the two groups of patients were not treated at the same time, and it is possible that unknown factors of selection may have influenced the results. Table VIII shows the one-year survival-rate published by other workers who have used 200–250 kV therapy.

TABLE VI—PALLIATION

Symptom	Improved	Not improved
Hæmoptysis	47 (94%)	3 (6%)
Cough	106 (80%)	27 (20%)
Dyspnœa	81 (79%)	21 (21%)
Pain	30 (79%)	8 (21%)

TABLE VII—LUNG SHRINKAGE

Mos. from beginning of treatment	Number X-rayed	Evidence of lung shrinkage
3	34	20 (59%)
6	31	25 (81%)
12	23	20 (87%)

TABLE VIII—200–250 KV X-RAY THERAPY SURVIVAL-RATES

Reference	No. of patients	Proved histologically	Tumour dose	1-year survival
Dobbie (1944)	59	29%	5–6000	31%
Adelman (1952) ..	125	100%	5000r	20%
Hammersmith Hospital (1949–53)	176	61%	4000r or more	24%
Bignall (1956)	93	80%	4000r or more	36%

Mean one-year survival of all patients receiving more than 4000r was 26%.

TABLE IX—MEGAVOLTAGE X-RAY THERAPY SURVIVAL-RATES

Reference	No. of patients	Proved histologically	Tumour dose	1-year survival
Hare et al. (1953) (2,000,000 V)	22	50%	6000r	42%
Guttman (1955) (2,000,000 V X rays)	100	100%	5000–6000r	24%
Watson (1956) (2,000,000 V betatron)	27	61%	More than 5500r	31%
This series (8,000,000 V) ..	199	78%	4500 rad	32%

Mean one-year survival of all patients was 30%.

Table IX shows the published results of treatment by megavoltage therapy.

Summary

The advantages of megavoltage X-ray therapy in the treatment of inoperable carcinoma of the bronchus are discussed.

An account is given of the technique of treatment with the 8-million-volt linear accelerator.

The results of treating 199 patients are given in terms of the palliation obtained and the one-year survival-rate.

The immediate effects of irradiation and the incidence of post-radiation fibrosis in the lungs are reported.

The survival-rates are compared with other series treated by conventional methods and by megavoltage therapy.

We wish to thank Dr. P. Armitage, of the Medical Research Council Statistical Unit, for advising us on the method of presenting the results.

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". . . The home must sometimes become a personal and highly individualized hospital for the patient, and the reverse is also true—the highly technical impersonal hospital must be converted into a temporary home for the sick man. The prevailing barriers to reorganization—negativism, vested interests, inertia, fear of the loss of institutional identity and appeal—in putting such principles into practice in every case are known to us but they can be surmounted. If the patient's needs are borne in mind, the two resources—home and hospital—can become interchangeable as occasion demands, and complementary on the most favourable terms. . . . "—E. M. BLUESTONE, *Trans. Coll. Phycns Philad.* 1957, **25**, 24.

LIPOPROTEIN PATTERNS IN MYOCARDIAL INFARCTION

RELATIONSHIP BETWEEN THE COMPONENTS IDENTIFIED BY PAPER ELECTROPHORESIS AND IN THE ULTRACENTRIFUGE

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INVESTIGATIONS of the relation of serum-lipids to coronary-artery disease falls into four main categories:

(1) Straight chemical determination of total cholesterol and (more rarely) phospholipid (e.g., Gertler et al. 1950).

(2) Determination of the distribution of cholesterol between α and β lipoproteins by means of the Cohn fractionation.

(3) Ultracentrifugal analysis of the β-lipid components.

(4) Fractionation of the lipoproteins by paper or zone electrophoresis (e.g., Jencks et al. 1956).

In 1955 Dangerfield and Smith, using paper electrophoresis, drew attention to an abnormal lipid band, the "pre-β-lipid," which was seen in the serum of most patients with myocardial infarction and tended to increase after the infarction. Examination of sera from a larger series of patients with myocardial infarction has amply confirmed this finding. I describe here the distribution of this component in 83 patients with fresh myocardial infarction and compare it with that in 120 normal people, 50 patients with angina or old infarcts, and 50 patients with peripheral arterial disease or hypertension.

Correlation between Methods

The correlation between the Cohn fractionation and electrophoresis has been well established (Cohn et al. 1950, Russ et al. 1951, Barr 1953). With serum from most patients (except those with liver disease) the Cohn fractionation, when correctly carried out by method 10, divides the lipoproteins cleanly into the α-lipids (fractions 4, 5, 6) and all the β-lipids (fractions 1, 2, 3).

The correlation between the ultracentrifugal lipoprotein groups of Gofman (Gofman et al. 1950, Glazier et al. 1954) and the electrophoretic lipoprotein components has not, however, been fully established. Lewis and Page (1953) prepared a total-lipoprotein concentrate by preparative ultracentrifugation and compared its behaviour in the analytical ultracentrifuge and in the Tiselius electrophoresis apparatus. They did not, however, isolate fractions for direct comparison of S_f values and mobilities. The results on isolated fractions are reported below; and, although the lipoprotein components do not move in the same relative order in gravitational and electrical fields, there is a surprisingly clear correlation between the major low-density groups of Gofman (Glazier et al. 1954) and the β-lipid components of the paper-electrophoretic pattern. The clarification of this relationship allows qualitative comparison between the results obtained by paper electrophoresis and the large series of results obtained with the ultracentrifuge in the U.S.A., and thus it may be of value to laboratories which have no facilities for ultracentrifugation.

Methods

PAPER ELECTROPHORESIS

Electrophoresis of Serum

The method and quantities described by Dangerfield and Smith (1955) were followed exactly. In most of the recent patterns Whatman no. 3-mm. filterpaper was used instead of no. 100.

Assessment of pre-β-lipid Level

No satisfactory method has been devised for quantitative assessment of the pre-β-lipid level. The pre-β-lipid band is overlapped by the front of the β-lipoprotein band, which means that both the assessment of the area under the scanning curves and the cutting out of the fractions for elution are subject to serious error (Smith 1956). An arbitrary system of scoring has therefore been used to give a rough assessment of its level without implying a greater accuracy than is justified.

The *extent* was scored according to the position of the front of the pre-β-lipid (see fig. 1):

Front	between β-globulin and a_2-globulin	score = 1/2
,,	level with back of a_2-globulin	,, = 1
,,	half-way through a_2-globulin	,, = 2
,,	level with front of a_2-globulin	,, = 3

The *density* of staining was assessed purely subjectively and scored from 1/2 to 4.

The sum of these two scores was used to indicate the pre-β-lipid level.

ULTRACENTRIFUGAL FRACTIONATION

The lipoproteins were divided into five different density classes by varying the speed and time of centrifugation and the salt density of the medium. They collect at the surface of the ultracentrifuge tube as an oily or turbid layer, which can be sucked off with a Pasteur pipette (de Lalla and Gofman 1954).

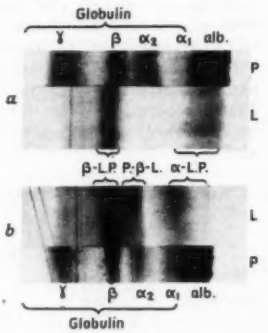

Fig. 1—Electrophoretic patterns given by serum (a) from a normal woman and (b) from a patient 5 weeks after acute myocardial infarction. P, part of strip stained for protein; L, part of strip stained for lipid; alb., albumin; α-L.P., α-lipoprotein; β-L.P., β-lipoprotein; P.-β-L., pre-β-lipid.

Preparation of Fractions in Spinco Model L Ultracentrifuge with 30·2 rotor

Fraction 1.—Undiluted serum 9·0 ml. was spun for 45 minutes at 10,000 r.p.m., and 0·5 ml. was collected from the surface; 0·5 ml. of NaCl solution, D = 1·0073, was added to the remainder of the original sample and thoroughly mixed. The serum was then spun for 45 minutes at 10,000 r.p.m., and a further 0·5 ml. was collected from the surface. The two collected portions were suspended together in 8·0 ml. of NaCl solution, D = 1·0073, and spun for 60 minutes at 10,000 r.p.m., and 0·5 ml. of lipoprotein concentrate was collected from the surface and labelled "fraction 1."

Fraction 2.—The remainder of the fluid from which fraction 1 was taken was brought up to 9·0 ml. with 0·5 ml. of NaCl solution, D = 1·0073, and the above procedure was repeated, except that the fluid was spun twice for 90 minutes at 20,000 r.p.m. and the two collected portions were spun for 90 minutes at 20,000 r.p.m., before the uppermost 0·5 ml. was collected and labelled "fraction 2."

Fraction 3.—The remainder of the fluid from which fraction 2 was taken was brought up to 9 ml. with 0·5 ml. of NaCl solution, D = 1·0073, mixed, and spun for 7–12 hours at 30,000 r.p.m.; and 0·5 ml. was collected from the surface and labelled "fraction 3." During this prolonged centrifugation the serum-proteins sediment towards the bottom of the tube, and the top layer contains no albumin. The albumin-free fractions 3, 4, and 5 were not washed.

Fraction 4.—A further 0·5 ml. was removed from the surface, leaving 8·0 ml., which was thoroughly mixed with 1·0 ml. of NaCl solution, D = 1·1315, giving a final salt density of 1·021. This solution was spun for 7–12 hours at 30,000 r.p.m., and 0·5 ml. was collected from the surface and labelled "fraction 4."

Fraction 5.—8·0 ml. of the fluid from which fraction 4 was taken was mixed with 1 ml. of NaBr solution, D = 1·390, giving a final salt density of 1·062. The solution was spun at 30,000 r.p.m. for 7–12 hours, and a 1·0 ml. albumin-free fraction was collected from the surface and labelled "fraction 5."

Determination of S_f Values

All the fractions were adjusted to a salt density of 1·062–1·063 before being spun in the Spinco model-E analytical ultracentrifuge. Fractions 1, 2, and 3 (0·5 ml.) were mixed with 0·4 ml. of NaCl solution, D = 1·1315, and 0·5 ml. of fraction 4 was mixed with 0·3 ml. of this solution.

Fractions 1 and 2 were spun at 35,600 r.p.m., and fractions 3, 4, and 5 at 52,640 r.p.m. In all cases six photographs were taken during the run, and time/distance curves were plotted from which the sedimentation constants were calculated. All the runs were made at 26°C.

The sedimentation constant is given by

$$S = \frac{dx/dt}{\omega^2 x} = \frac{\log_{10} x \times \log_e 10}{\omega^2 t}$$

where x is the distance in cm. from the axis of rotation; ω is the angular velocity in radians per second; and t is the time in seconds.

1 Svedberg unit $= 1 \times 10^{13}$ cm. per sec. per dyne per g.

All S_f values are for a salt density of 1·063 at 26°C. No correction for concentration was made in these experiments; their object was to assign the fractions to the broad classes (S_f 0–12; 12–20; 20–100; and 100–400) described by Gofman and not to make detailed studies of their sedimentation behaviour.

Paper Electrophoresis of Fractions

Lipid-poor serum was prepared either by removing all lipids by spinning at 30,000 r.p.m. for 12 hours at a salt density of 1·21, or by removing all β-lipids by spinning at a salt density of 1·063 (this preparation still contains α-lipoproteins). The infranatant solutions of proteins were then dialysed against a 10% solution of dextran in 5% glucose (Bengers).

Each lipoprotein fraction (at D = 1·063) was mixed with half its volume of this serum-protein preparation and dialysed

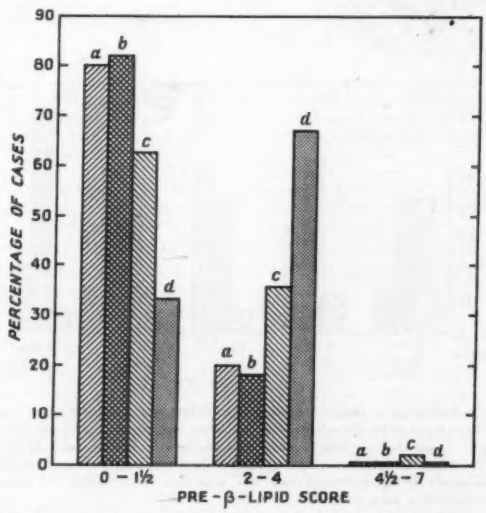

Fig. 2—Distribution of minimal, moderate, and large pre-β-lipid bands in "normal" subjects. (*a*), 20 women of average age 40; (*b*), 22 men aged 30 or less (average 24); (*c*), 66 men aged 31—50 (average 41); and (*d*), 15 men aged more than 50 (average 55).

against the dextran solution to remove salt without diluting the preparation. The addition of serum-proteins provides an internal protein marker for the electrophoresis and appears to stabilise the lipoprotein during dialysis and electrophoresis. In the early experiments in which this precaution was not taken all the fractions tended to deposit lipid on the origin (point of application), and their mobility was erratic and changed rapidly on storage.

All the fractions, together with the original serum, were run simultaneously on a wide sheet of Whatman no. 3-mm. filterpaper.

Results

The electrophoretic pattern of lipids of a normal young adult (fig. 1*a*) shows a strong α-lipoprotein band extending from the front of the α_1-globulin band into the albumin band; a strong and sharply defined β-lipoprotein band level with the β-globulin band; and a diffuse "trail" of lipid extending from the origin (point of application) to the β-lipoprotein band. In postprandial lipæmia a band of lipid that does not migrate is deposited on the origin.

Various changes take place in pathological conditions (Swahn 1953, Dangerfield and Smith 1955): the α-lipoproteins are often decreased; the β-lipoprotein may be greatly increased (it is rarely decreased below the normal

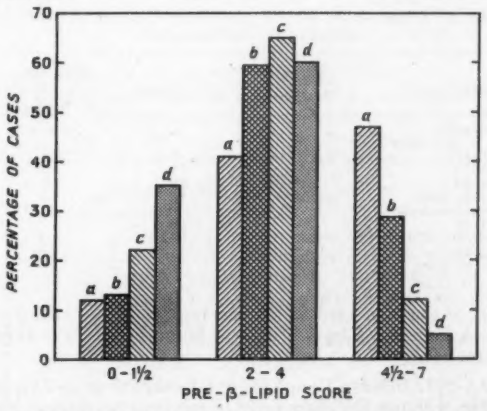

Fig. 3—Distribution of minimal, moderate, and large pre-β-lipid bands (*a*) in 83 patients with fresh myocardial infarction (within 3 months of the attack); (*b*) in 50 patients with angina and old myocardial infarction (more than 3 months after the attack); (*c*) in 50 patients with either peripheral arterial disease or hypertension; and (*d*) in 37 controls over 50 years of age. Average ages for each group are 56, 57, 58, and 55 respectively.

level); the "trail" and lipid deposit on the origin may be increased; and a new component, the pre-β-lipid, may appear ahead of the β-lipoprotein band. This is a common finding in myocardial infarction and is illustrated in fig. 1*b*.

Pre-β-lipid Band in Normal Subjects

Serum was examined from 120 supposedly healthy people—44 blood-donors, 40 medical students and laboratory staff, and 36 members of the Services. The blood-donors were not given a thorough medical examination; and it is probable that many of the older ones had some degree of atheroma or hypertension. Electrocardiography was not done.

The occurrence of a pre-β-lipid band was found to have a strong correlation with sex and age. Fig. 2 shows the percentage of subjects with minimal (scores 0–1½), moderate (scores 2–4), and large (scores 4½–7) pre-β-lipid bands in women, in men under 30, in men between 30 and 50, and in men over 50 years of age. Whereas 80% of the women (average age 40) and 83% of men under 30 had no pre-β-lipid, a moderate amount was present in

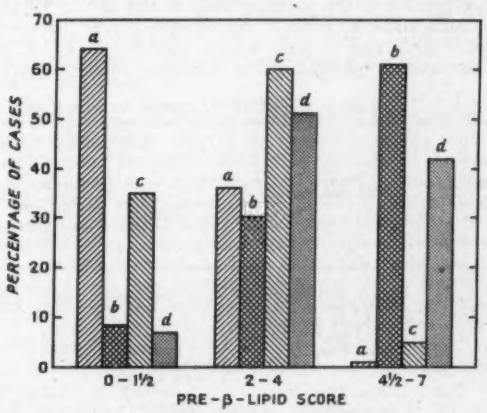

Fig. 4—Distribution of minimal, moderate, and large pre-β-lipid bands (*a*) in healthy men aged 31—50; (*b*) in men aged 31—50 with myocardial infarction; (*c*) in healthy men aged more than 50; and (*d*) in men aged more than 50 with myocardial infarction. (23 infarcts and 66 normals aged 31—50; 43 infarcts and 37 normals 51 years of age and above.)

TABLE I—AVERAGE SCORE OF PRE-β-LIPID BAND IN MEN OF DIFFERENT AGE-GROUPS

Age-group (yr.)	Average age (yr.)	No. of men	Average pre-β-lipid score
Myocardial infarction :			
31–40	36	5	4·4
41–50	47	18	4·3
51–60	56	29	4·1
61 or more ..	66	15	3·9
Normal controls :			
31–40	35	30	1·5
41–50	46	36	1·3
51–60	54	24	1·8
61 or more ..	71	7	1·6

36% of the men aged 31–50 and in 67% of the men over 50. A large pre-β-lipid band was found in only 1 of these normal subjects.

Pre-β-lipid Band in Peripheral or Coronary Arterial Disease

Fig. 3 shows the percentage of minimal, moderate, and large pre-β-lipid bands in the serum of 83 patients with established acute myocardial infarction (examined within three months of the attack) in 50 patients with angina or old infarcts (more than three months after the attack), and in 50 patients with claudication or other evidence of peripheral vascular disease or with hypertension. These are compared with 37 control men comprising the 15 blood-donors over 50 years of age and an additional 22 hospital patients over 50 with normal blood-pressure, normal electrocardiograms, and no evidence of peripheral arteriosclerosis.

In comparable age-groups the prevalence of a moderate pre-β-lipid band is the same for patients with clinical symptoms of peripheral arteriosclerosis, for patients with angina and old infarcts, and for those without symptoms. It thus appears that a moderate pre-β-lipid band does not differentiate those who have developed clinical cardiovascular disease from those who have not.

The results indicate, however, that a large pre-β-lipid band is often associated with an infarct or other definite evidence of coronary-artery disease. This large band was found in the serum of 47% of patients with fresh infarcts and in 29% of patients with old infarcts or with angina, but in only 12% of patients with peripheral arteriosclerosis and in only 2 of the controls.

Patients with Fresh Myocardial Infarcts

Effect of age on pre-β-lipid level.—Among men with infarction the degree of lipid abnormality appears to be rather greater in the younger than in the older. Of the 5 patients under 40 years of age, the pre-β-lipid band was massive in 3, and in none was it absent. In fig. 4 the percentages of patients with minimal, moderate, and large pre-β-lipid bands are compared for 23 patients aged 31–50 and 44 patients aged 51–74. Of the younger group 61% had a large pre-β-lipid band with an average score of 4·4, whereas in the older group only 42% had a large band, with an average score of 3·9. The average pre-β-lipid scores in normal men and in patients with myocardial infarction are compared for four age-groups in table I.

Changes in lipid pattern after the attack.—In several patients the lipid pattern was relatively normal if examined within a few hours of the attack but showed a conspicuous pre-β-lipid band when re-examined two or three weeks later (fig. 5). In an attempt to confirm this observation successive samples of serum were run at intervals of about ten days in 28 patients. In 5 of these there was a dramatic increase in pre-β-lipid level—e.g., from 2 on the third day to 7 on the sixteenth day ; from $2^1/_2$ on the first day to 5, 6, and 7 on the seventeenth, twenty-fourth, and thirtieth days ; and from 0 on the

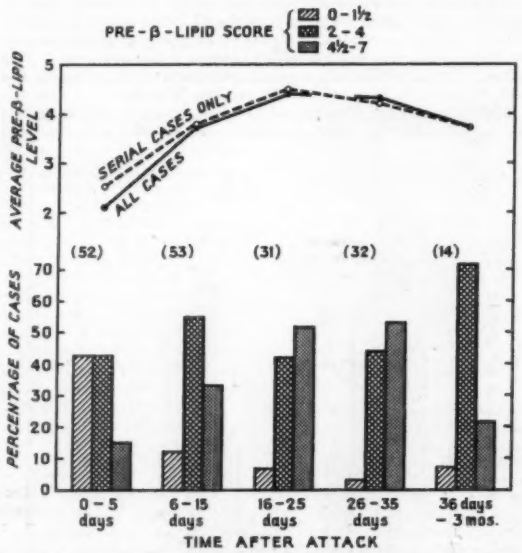

Fig. 5—Influence of length of time after infarction on pre-β-lipid level. Histograms show distribution of minimal, moderate, and large pre-β-lipid bands during first 5 days and successive 10-day periods after infarction. Graphs show average pre-β-lipid score during each period ; numerals in parentheses are the numbers of samples of serum examined in each period.

TABLE II—LIPID PATTERN IN FOUR MEN BEFORE AND AFTER MYOCARDIAL INFARCTION

Case no.	Age (yr.)	Previous history	Before infarction					After infarction				Remarks
			Time	Serum-cholesterol (mg. per 100 ml.)	Electrophoresis			Time	Electrophoresis			
					α-Lipoprotein	Pre-β-lipid	β-Lipoprotein		α-Lipoprotein	Pre-β-lipid	β-Lipoprotein	
1	64	Angina and claudication 5 yr. † coronary thrombosis a yr. ago	7, 5, and 2 wk.	260	Normal	Nil	Normal	About 5 hr.	Normal	Nil	Normal	Died
2	49	Angina 2 or 3 yr.	5 samples between 5 wk. and 5 days	321	Normal	5	Very high	About 3 hr.	No change	No change	No change	Died in a few hr.
3	59	Angina 2 yr.	7 samples between 14 and 2 wk.	315	Normal	3	High	Same day	Very low	2–1½	No change	Died
								3 days	Low	4	,,	
								7 ,,	Moderate	4	,,	
4	66	Angina 1 yr.	8, 6, and 3 wk.	225	Normal	3	Normal	Same day	No change	No change	No change	
								8 days	Low	2½	,,	
								14 ,,	,,	4½	,,	
								6 wk.	Normal	3	,,	

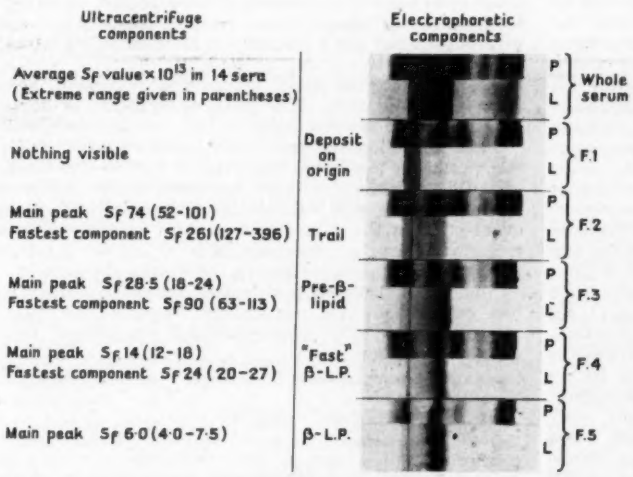

Fig. 6—Relationship between electrophoretic and ultracentrifugal behaviour of isolated lipoprotein fractions. Electrophoretic patterns were obtained by fractionation from one sample of serum from a case of myocardial infarction. The ultracentrifugal S_f values are average of values found in 14 different sera.

first day to 5 on the twenty-eighth day. In 17 patients there was a moderate or marked increase, and in 6 there was no increase. Of these 6 patients 4 had massive pre-β-lipid bands on the first examination; in 1 it was moderate; and in 1 woman a trace in the first sample subsequently disappeared.

The results are summarised in fig. 5, which shows the distribution of pre-β-lipid at different times after infarction in 182 serum samples from 83 patients; 107 samples were from the 28 patients followed serially, and the remainder were from patients from whom only one sample, or occasionally two samples, were obtained. The results are striking: of the 52 sera examined during the first five days there was no pre-β-lipid band in 42%, and it was large in only 15% of samples; whereas of the 64 sera examined between the sixteenth and thirty-fifth days there was no pre-β-lipid band in only about 5%, and it was large in more than 50%. The average pre-β-lipid level for each period likewise shows a considerable increase from 1·8 in the first five days to 4·5 between the sixteenth and twenty-fifth.

Patients Examined Before and After Myocardial Infarction

The increase in pre-β-lipid after infarction raises the important question whether the abnormal lipids are present before the event or appear in response to conditions arising from the infarct. The general increase from the first day to about the third to the fifth week appears to be indisputable, but possibly the initial low levels result from a modification of the original pattern at the time of the shock. The relationship between the pre-infarction and post-infarction patterns can be determined only by examining the lipoproteins before and after the attack in a reasonably large series of cases, and it is hard to see how such a series could be collected.

In this hospital 4 such patients were examined, and the results are summarised in table II. All 4 had angina, and 1 of them had a history of previous myocardial infarction.

Patients 1 and 2, from each of whom only one sample of blood was obtained after the attack, showed no change; one had a normal pattern, and the other a high pre-β-lipid level and a high β-lipoprotein level.

In patient 3 both the α-lipoprotein and the pre-β-lipid were somewhat decreased immediately after the attack but subsequently increased, the pre-β-lipid above the original level.

Patient 4 showed no immediate change, but at the end of a week the pre-β-lipid level was lower and then rose above the original level.

Clearly no firm conclusion can be drawn from this small and heterageneous series, but there is no evidence that the pattern is strikingly modified immediately after the infarction.

Correlation between Electrophoretic and Ultracentrifugal Components

The relationship between the electrophoretic properties and the flotation rates (S_f values) of the lipoproteins isolated by the ultracentrifugal fractionation described above is summarised for 14 sera in fig. 6.

In the analytical ultracentrifuge fractions 4 and 5 give symmetrical and homogeneous peaks; fraction 3 gives a well-defined peak with a considerable "tail" of faster material which accounts for an average of about 25% of the total area; fraction 2 gives a small and rapidly spreading peak with 40–50% of faster material; and fraction 1 gives no boundary at all. The groups or bands of lipoproteins whose concentration is measured in the more recent work of Gofman and his associates (Glazier et al. 1954) are related to these fractions in the following way:

S_f 0–12: a well-defined peak corresponding electrophoretically to pure β-lipoprotein and exactly comparable with fraction 5.

S_f 12–20: also a well-defined component which appears as a shoulder ahead of the S_f 0–12 peak in some sera; 85% of fraction 4 consists of this component, but by electrophoresis it migrates only slightly faster than β-lipoprotein, from which it is not separable.

S_f 20–100 and S_f 100–400: the limits of these groups have been arbitrarily selected by Gofman, and the groups do not quite correspond to the groups in fractions 3 and 2. In fraction 3 an S_f 18–42 peak accounts for 75% of the lipoprotein, and the faster material extends to S_f 90. This is overlapped by fraction 2, which covers the range S_f 70–400. Electrophoretically, fraction 3 consists of pre-β-lipid with a small amount of "trail," whereas fraction 2 consists exclusively of "trail."

This fractionation has thus shown that, in paper electrophoresis, the pre-β-lipid is a separate kind of lipoprotein and does not arise from overloading the paper with β-lipoprotein, and that the "trail" does not consist of adsorbed β-lipoprotein. The pre-β-lipid can be roughly equated with the S_f 20–100 group of Gofman, and the fact that the same group of lipoproteins has been associated with coronary-artery disease when independently studied by two totally different physical methods appears highly significant.

Discussion

If it is assumed that the pre-β-lipid is roughly equivalent to the S 20–100 group of lipoproteins, the results reported here can be compared with the findings of American workers using ultracentrifugal techniques. Both Glazier et al. (1954) and Lawry et al. (1957) found in men a steady increase with age in the concentration of S_f 20–100 lipoproteins up to a maximum at the age of about 55–60, whereas in women the level remained relatively low until the age of 60. Lawry et al. also found higher cholesterol and S_f20–100 lipoprotein levels in their younger patients with myocardial infarction; hence, as in the present series, the difference between the patients with infarcts and the healthy people was greatest in the younger age-groups.

A question of fundamental importance is to what degree the lipids are abnormal before the infarct and to what extent the lipid pattern is changed by the infarct. Until this has been settled, interpretation of lipoprotein data in relation to heart-disease must be greatly handicapped. An attempt to establish the extent to which lipoprotein abnormality precedes and predicts coronary-

artery disease was made in a study in America directed by the National Advisory Heart Council (1956), in which the lipids were examined in 4914 clinically healthy men aged 40–59. 63 of these developed symptoms of coronary-artery disease during follow-up, and their lipid levels before the event were compared with those found in the basic population. Interpretation of the result seems to have been highly controversial, but by any of the measures published—the uncorrected figures, the corrected "standard" values, or the "atherogenic index"—the correlation between abnormal lipids and the development of coronary-artery disease is not impressive, and the differences are too small, and the degree of overlap too great, for any of the lipid measurements to be a useful predictive tool.

If these before-the-event results are compared with the results reported here and by the Gofman group (Jones et al. 1951) in established cases of myocardial infarction they are found to be strikingly different. When the results are expressed as cumulative percentage curves for the before-the-event group, even using the atherogenic index, which gives the maximum differentiation, only 37% of the men who subsequently experienced "new events" lay above the 75th percentile for the normal population, whereas for the (presumably uncorrected) S_f 12–20 lipoprotein levels reported by Jones et al. (1951) 70% of the established cases of infarction lay above the 75th percentile of the normals. This figures is identical with that obtained when similar cumulative percentage curves are plotted for the pre-β-lipid level. If the cutting-point is taken at the 90th percentile of the normal populations, only 10% of those who subsequently developed coronary-artery disease had atherogenic indices above this level, whereas in the two series with established infarcts over 50% of cases had pre-β-lipid or S_f 12–20 levels above the 90th percentile of the normal populations.

Lawry et al. (1957) publish data from cases before and after myocardial infarction. From their comparison of 1100 healthy men (aged 40–59), 18 men with infarcts examined less than eight weeks after the attack, 171 men with infarcts examined more than eight weeks after the attack and 8 "new events" examined before the attack, it appeared that the total-cholesterol level is raised to about the same extent in all three abnormal groups; but, whereas the level of the S_f 12–20 lipoproteins was unchanged and that of the S_f 20–100 lipoproteins only slightly raised in the "new events," the levels of both these lipoproteins were much raised in the post-infarction groups.

This indirect evidence, together with the results presented in this paper, strongly suggest that, although there is undoubtedly some degree of lipid abnormality before infarction, it is greatly increased after the event. Proof of this proposition can only be obtained from actual data. Ideally the lipids should be examined in the same individual shortly before and at regular intervals after the attack—an investigation that would be extremely difficult to organise but in which even a few cases might yield very valuable results.

Summary

Serum-lipoproteins were studied by paper electrophoresis in normal subjects and in patients with peripheral arterial disease and coronary-artery disease.

A characteristic lipoprotein band, the pre-β-lipid, is found to be associated with myocardial infarction.

There is no pre-β-lipid in 80–85% of normal women or of normal men under 30 years of age, but in men its prevalence increases rapidly with age and a moderate band is present in nearly 70% of men over 50. A large pre-β-lipid band is virtually unknown in normal individuals of any age.

The prevalence and degree of abnormality are little greater in a comparable age-group with claudication, other symptoms of peripheral arterial disease, or hypertension than in "normal" men over 50. Even of patients with angina and old myocardial infarction only 25–30% showed gross abnormality of lipids.

Of patients with fresh myocardial infarction 90% show some, and 50% show gross, abnormality of lipids. The proportion is even higher in the younger patients.

After infarction the pre-β-lipid increases considerably and reaches a maximum three and a half to five weeks after the attack. In patients examined before and after infarction there was little change immediately after the event; hence the subsequent increase appears to be a true rise above the pre-infarction level and not a return to that level after a temporary fall during the attack.

Analysis of isolated low-density lipoprotein fractions has established the relationship between the paper electrophoretic and ultracentrifugal lipoprotein components as follows:

Electrophoretic component	*Ultracentrifugal components*
Deposit on origin	Nothing seen
"Trail" lipids (origin to β-lipoprotein)	S_f 70–400
Pre-β-lipid	S_f 18–90
"Fast" β-lipoprotein	S_f 12–20
β-lipoprotein	S_f 0–12

Thus the pre-β-lipid corresponds approximately to the S_f 20–100 group of Gofman.

Part of this work was done in the department of chemical pathology of St. Bartholomew's Hospital, and part in the Courtauld Institute of Biochemistry with the support of the Medical Research Council. I should like to thank Dr. G. W. Hayward and Dr. W. G. Dangerfield, who initiated this work, and to acknowledge the help of many medical colleagues from both hospitals who supplied blood samples.

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AN OUTBREAK OF ENCEPHALOMYELITIS IN SIERRA LEONE

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IN a brief report (Rose 1956) I described an outbreak of what appeared to be a virulent encephalomyelitis in Sierra Leone. This epidemic now seems to be over, and a total of 45 undoubted cases, seen between October, 1955, and October, 1956, can be recorded.

The Patients

All the patients were seen at the Nixon Memorial Hospital, which serves a large area of tropical forest in south-east Sierra Leone and the neighbouring part of French West Africa and Liberia. In the recent search for diamonds, tens of thousands of Africans have poured into the region; and most of the newcomers live in settlements in the "bush" with practically no sanitary or medical supervision.

AGE-DISTRIBUTION IN 45 PATIENTS

Age	0–9	10–19	20–29	30–39	40–49	50–59	60–69
No. of patients	3	6	13	16	4	2	1

Of the 45 patients, 25 were male and 20 female. 35 were Africans, 7 Europeans, 2 Lebanese and 1 Indian. The age-distribution is shown in the accompanying table. 19 patients came from Sefadu (the main town in the chief diamond-digging area) or from diamond settlements near there, and in 12 the disease began in the hospital (staff or patients).

Three Phases

The outbreak could be divided into three phases, which merged gradually into each other.

Phase 1 (Oct. 25 to Nov. 19, 1955).—In the 7 cases in this period, all of them fatal, the disease was fulminating and choleraic. All the patients were Africans who had been in the diamond areas. Records of these cases are the least complete.

Phase 2 (Nov. 20, 1955 to May 16, 1956).—Of 22 patients, 5 died; probably 3 others died soon after leaving us. Some could not be admitted for lack of beds, and others refused admission. The disease was still severe in this phase, but the involvement of the central nervous system was now much more definite, and anxiety, amounting at times to terror, was prominent. All the European cases were seen during this phase and the evidence for the infective nature of the disease was strong in 3 cases. The almost continuous retching and vomiting usually overshadowed the diarrhœa.

Phase 3 (June 11 to Oct. 13, 1956).—16 cases with only 1 death during this period indicate a striking decrease in severity, though most patients caused us anxiety at some stage of their illness. Stupor and other changes in mentality were more prominent and vomiting less so. The infective nature was clearly shown when the disease spread through the women's general ward in June and July, 1956. In 10 of the 20 patients in the ward, suspicious signs or symptoms developed, and a few patients ran away; in others it abated after a few days, leaving the 5 more definite cases here recorded.

Features of the Outbreak

Unfortunately the data are incomplete, particularly for the early cases when the nature of the disease was not recognised and the urgency of the patients' predicament precluded full history-taking and examination.

Symptoms

All patients had pyrexia, headache, and anorexia. Other symptoms were recorded as follows in the 45 patients:

	No. of patients		No. of patients
Vertigo	30	Neck stiffness	23
Nausea	36	Pain at costal margin	23
Vomiting	22	Prostration	35
Diarrhœa	25	Dysphagia	10
Generalised myalgia	32	Sore throat	8
Neck pain	24		

Several of our staff had headache, giddiness, and nausea for a few days, and sometimes pyrexia, sore throat, and vomiting. All these cleared without specific treatment and these cases have not been included in our list, although they may represent mild and atypical examples.

Physical Signs

The temperature usually rose rapidly to swing between 101° and 105° F, and tended to settle within a week, but it fell more slowly in some cases, when a temperature of 102-103° F commonly persisted for two to three weeks. Early relapses were accompanied by a sharp rise in temperature. The pulse was typically full and slow.

Some patients had a transient cough, but no abnormal physical signs in the chest. When palpable, the liver was soft and not tender. The spleen was felt in 7 cases and was not tender (in adults in this region, the spleen can be felt in about 5%). Some patients had retention, frequency, and precipitancy of urine, all of which were transitory.

Neurological findings were classified as follows:

	No. of patients		No. of patients
Anxiety	25	Paralyses	5
Stupor	16	Tremors	14
Coma	7	Anæsthesia	2
Other mental changes	11	Hyperæsthesia	17
Eye changes	6	Clonus	7
Changes in micturition	16	Positive Kernig's sign	3

A record of abdominal reflexes was made in 36 cases (normal 12, increased 7, decreased 3, absent 14). The state of the abdominal reflexes varied during the course of the illness in 3 of these patients. A note of tendon reflexes was recorded in 42 cases (normal 6, increased 17, decreased 6, absent 13), but findings varied in as many as 12 of these patients.

Retinoscopy (done in most cases) revealed no abnormalities. There were pupillary changes in only 3 cases. No ocular palsies were noted, and nystagmus, even during vertigo, was never prominent. 2 patients had hemianopia.

Laboratory Findings

The cerebrospinal fluid was normal in the 17 cases in which it was examined and the erythrocyte sedimentation-rate was normal in the 5 cases investigated. The white-cell count was measured in 16 cases and in 14 it lay between 7800 and 12,500 per c.mm. In the other 2 it was 15,000 and 14,900.

Strong local tradition, and the fear of cannibalism and of the use of human organs to prepare "strong medicine," prevented necropsy in all but 2 cases (see illustrative cases below).

The stools contained ova of *Ascaris lumbricoides* or *Ancylostoma duodenale* in 9, and cysts of *Entamœba histolytica* in 2 cases. All malarial parasites found were *Plasmodium falciparum*. The Widal test was negative in the 5 cases in which it was performed and so was the Weil-Felix test in 2 cases.

Illustrative Cases

Case 1.—A woman, aged 30, was admitted at full term with vaginal bleeding. At another hospital 70 miles away high fever with vomiting had developed the day before and she had been given an injection of quinine. She was collapsed, and vomited watery fluid every fifteen minutes or so, with severe retching. She was fully conscious and very apprehensive. She had severe pain in the head, neck, and back, and a sharp pain in the costal margin, worse on breathing. Penicillin and intravenous glucose and saline solution were given, but her condition deteriorated rapidly and she was soon pulseless and very cyanosed, though still alert. Hyperæsthesia and myalgia became intense and she could not bear to be touched. All reflexes were absent, but there were fibrillary movements in some muscles. By 5 P.M. that day she was in a state of terror unrelieved by morphine, pethidine, and hyoscine. She continued to vomit, and had a small hæmatemesis shortly before she died that evening. She was nursed exclusively by our senior missionary nursing sister (see case 2).

Case 2.—Our senior missionary nursing sister, aged 46, had moderate hypertension. On Dec. 3, 1955, (thirty-three days after the death of case 1, whom she had nursed) she complained of headache. Next day this was worse and she began to vomit and anorexia was complete. Next day vertigo and intense headache resembling migraine developed. Ergotamine tartrate ('Femergen') gave only temporary relief. Her temperature rose to 104°F and remained high. Symptoms persisted, and her neck and back became painful and tender. Soft lymph-nodes appeared in the neck, which was stiff but not retracted. A severe pain began suddenly in the left hypochondrium, unaccompanied by any abnormal physical signs, but causing dyspnœa. She had hyperæsthesia and myalgia; the reflexes were exaggerated and equal and Kernig's sign negative. Though normally placid, she became very apprehensive and restless. Catheterisation produced only a little smoky urine, with much albumin and casts. The pulse-rate remained steady and strong at around 80 until shortly before her death. Two days before her death widespread tremors set in with paresis of extensor limb muscles. The abdominal pain and distension and dyspnœa increased and she was cyanosed. An abdominal catastrophe was suspected and preparations were made for laparotomy, but she died before this was begun. No analgesics had controlled the pain or apprehension.

A limited necropsy revealed no intra-abdominal lesion. The liver was small and hard; sections of liver and intestines showed no definite pathological changes.

Case 3.—This man was admitted with a week's history of fever, headache, vertigo, pains in the neck and back, anorexia, and intense nausea but no vomiting. He looked frightened and lay quite still in bed. He was very weak and wasted. The day before, severe pain started round the costal margin and his neck became stiff. He had a temperature of 103·5°F, generalised cutaneous hyperæsthesia, brisk reflexes, and a negative Kernig's sign. A course of oral chloramphenicol was begun; the fever slowly settled and the vertigo decreased. He had retention of urine for forty-eight hours after admission, but, after that, micturition was normal. The cerebrospinal fluid was normal, and both Widal and Weil-Felix tests were negative. After five days, chloramphenicol (which was very scarce) was stopped; the headache and vertigo both became worse, and he had dysphagia. The reflexes were now sluggish, and the hyperæsthesia and myalgia abated. His appetite suddenly returned and he rapidly put on weight. The tendon reflexes (apart from the ankle jerks) soon returned and he seemed nearly well when, on Jan. 11, he suddenly complained again of headache and vertigo and refused to sit up. He said that he could not see clearly, and described objects as seeming to be cut in half. The pulse became full and slow, but there were no other changes in physical signs. After two days, without special treatment, he was fully recovered from this relapse and was discharged. When seen nine months later, he said that he had kept well.

Case 4.—A boy, aged 3 years, the son of the African catechist attached to the hospital, was taken ill suddenly with fever, vomiting, and watery diarrhœa. That evening, headache and neck stiffness developed; in the morning he was given a dose of castor oil, and became very toxic and weak. On admission at 2 P.M. that day, he was comatose, but resisting movements of the head and back. There were many râles in both lungs. The skin was dry, the abdomen moderately distended, and the liver enlarged. The muscles were very flabby and tender, but no actual paralysis was discovered though all tendon reflexes were absent. The C.S.F. was under normal tension and clear, with no cellular increase. Vomiting continued, and he became incontinent of fæces and died at 4.30 P.M.

At necropsy, the liver was large, hard, and dark. The mesenteric lymph-nodes were soft, pink, and large. There was creamy non-purulent exudate throughout both lungs. The meninges were hyperæmic, but contained no pus and were free from adhesions. The substance of the brain and spinal cord was pink and very soft, and contained some petechial hæmorrhages.

Case 5.—A woman, aged 30, had a very extensive vesico-vaginal fistula. While she was being prepared for a bilateral uretero-colic anastomosis, pyrexia of 104°F and a severe headache developed. Malarial parasites were found, and she was given intramuscular quinine followed by a mepacrine course, but the fever persisted, the headache became worse, and vertigo developed. She rapidly became very ill, with frequent retching and vomiting, followed soon by profuse watery diarrhœa. Her neck was painful and stiff and the reflexes sluggish, and she became disorientated. She had widespread loss of sensation to pin prick; her calves were tender to firm pressure. On Aug. 28 she vomited bright blood, and on Aug. 31, tremors of both hands began. By this time she was deeply stuporose. The C.S.F. was normal. Chloramphenicol was begun; the temperature began to fall and consciousness returned. She then became dyspnœic and had pain at the costal margin. The neck pain increased and the tremor extended up the whole of the left arm. A fine pustular rash now appeared on the upper arms, chest, and thighs. Her pupils became contracted but remained active and equal. On Sept. 7, her condition deteriorated and she became comatose. The rash quickly dried up and began to desquamate. The pupils became inactive and she died on Sept. 16.

Discussion

In late years, outbreaks of what is coming to be called benign myalgic encephalomyelitis have been reported in various parts of the world. The ætiology is still unknown and the clinical picture varies widely even within one outbreak, yet there is sufficient resemblance between many of the outbreaks to suggest a common basis. Acheson (1957) has recently enumerated the features which appear early in the disease and should suggest the diagnosis.

The Segbwema outbreak differs in several respects from others, chiefly in the mortality-rate. The term benign can hardly be applied to an outbreak of a disease with a mortality of at least 29%. Over two thirds of the patients had vomiting or diarrhœa or both, and most of the rest had nausea. The disease seen at Segbwema was intensely painful, and the patients' distress was aggravated by severe vertigo and terror. Myalgia was common and often severe, particularly in the neck, but the Bornholm-like pains around the costal margin were the outstanding feature and it is difficult to say whether they can be labelled myalgic.

Pain at the costal margin is common in Coxsackie-virus infections; so it is of interest that an E.C.H.O. virus, resembling Coxsackie type A, was isolated from patients with aseptic meningitis in Suffolk (Boissard et al. 1957), though these patients in fact had no such pain.

The diagnosis of encephalomyelitis was based on signs and symptoms which clearly indicated a diffuse and varied involvement of both brain and spinal cord of acute onset and rapid spread. Necropsy of the brain and spinal cord in case 3, although confined to naked-eye appearances, provides supporting evidence.

Caution is clearly necessary before proclaiming as "new" any disease appearing in such a region. Cerebral malaria, trypanosomiasis, toxoplasmosis, poliomyelitis, encephalitis lethargica, yellow fever, cholera, rickettsial disease, poisoning, and hysteria were all considered, but none fitted the clinical picture. Another reason for caution is the possibility of multiple ætiology. Many common features were evident, but some of these, at least, could have been unwittingly emphasised by patient, nurse, or doctor on the look-out for other cases. Most of the patients were seen both by my colleague, Mr. J. L. Wilkinson, and by myself, and we were soon convinced that this was something new in our clinical experience.

The antimicrobial drugs used were sulphaguanidine (in the earliest cases), penicillin, streptomycin, and chloramphenicol. There was no evidence that the first three had any specific action, but chloramphenicol seemed to lower the pyrexia in all cases, and sometimes the patient quickly improved. A few patients seemed worse for a day or two after starting chloramphenicol and then recovered quickly. 2 patients died despite chloramphenicol. From some of the later patients who seemed less severely ill, chloramphenicol was deliberately withheld, and 2 of these died. The reason for not using it was that, at first, we had little or none, and, later, we wished to compare the course of the illness with and without it. Our impression was that chloramphenicol was of distinct value when given early in the disease.

Summary

An outbreak of a hitherto unrecognised clinical entity involved 45 patients at a mission hospital in Sierra Leone between October, 1955, and October, 1956. Gastro-intestinal and neurological symptoms, terror, and pain at the costal margin, were prominent. 13 patients died. Chloramphenicol seemed to give some benefit. The illness was thought to be a form of encephalomyelitis.

My thanks are due to Dr. F. S. Carter, physician-specialist, Government Medical Service, Sierra Leone, and to Dr. J. H. Walters, late Director of the Central Laboratories of the West African Medical Research Council, who each saw a patient in consultation; and to Dr. T. P. Eddy, Director of Medical Services, Sierra Leone, for his advice and help during the outbreak.

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ASSOCIATION OF PULMONARY TUBERCULOSIS WITH ANKYLOSING SPONDYLITIS

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THE association of chest disease and ankylosing spondylitis in the same patient is well known (Dunham and Kautz 1941, Swain and Kuhns 1930). The big reduction in thoracic expansion in patients with ankylosing spondylitis has been described in detail by Hart et al. (1950), and they also reported the presence of pulmonary tuberculosis in 5 cases, in all of which the spondylitis preceded the tuberculosis. Robinson (1940) showed that the tuberculin sensitivity among patients with ankylosing spondylitis was 30% higher than in patients with other rheumatic diseases (excluding rheumatoid arthritis), but in his series there was no clinical evidence of tuberculosis. As far as we are aware, no population studies have been made of the association between ankylosing spondylitis and pulmonary tuberculosis. We too had previously noted a high death-rate from pulmonary tuberculosis in our ankylosing-spondylitis series prepared in an investigation into the incidence of leukæmia in that disease (Abbatt and Lea 1956). As our series was a " closed " one (i.e., follow-up of every case was complete) it was obviously very suitable for an investigation into the incidence of pulmonary tuberculosis in ankylosing spondylitis.

Analysis of the Series

The material used consisted of all discovered cases of ankylosing spondylitis in which the patient was pensioned for that disease by the Ministry of Pensions and National Insurance during the period Jan. 1, 1940, to Dec. 31, 1953—a total of 1981 cases. As we had the full clinical records of these patients, both before and after return to civilian life, it was simple to find how many of them had been notified as having pulmonary tuberculosis. Comparative cohort analysis was carried out, the number of man-years lived by the series found, and the expected number of notifications (for each year and each age-group) calculated by using the table of notification-rates of pulmonary tuberculosis given by the Registrar General (1956).

It could be argued that such a comparison is not valid, on the grounds that the incidence of pulmonary tuberculosis is not necessarily the same in the Forces as it is in the civilian population, and that the determination of the disease in the Forces is more complete than it is in the civilian population because of routine mass radiography and possibly greater facilities for diagnosis. Such a view, though undoubtedly applicable in certain circumstances, does not hold in the present instance, since in all but 3 of our cases the tuberculosis did not appear until some years after discharge from the Forces. In the 3 exceptions, pulmonary tuberculosis was discovered when the patient was radiographed for the spinal condition. Whether or not the spondylitis was present before the tuberculosis in these 3 cases we are not prepared to say.

The number of man-years lived by the series during the period of the investigation was 15,378·5, and the number of cases of pulmonary tuberculosis expected to be notified during this time was found to be 22·6. The actual number of cases of pulmonary tuberculosis notified during the period was 47. The difference between expectation and observation, 24·4 cases, was found to be 3·5 times the standard error. The probability of such an excess being due to chance is less than 1 in 1000. We therefore conclude that ankylosing spondylitis predisposes to the development of pulmonary tuberculosis. The obvious explanation of this is fixation of the thoracic cage, but the findings of Robinson, quoted above, leave open the possibility that the reason may be more obscure. Our data provide no evidence on this point.

Summary

The data from 1981 cases of ankylosing spondylitis in the records of the Ministry of Pensions and National Insurance have been analysed to find the number of notifications of pulmonary tuberculosis expected among them. The expected number was 22·6; the number of cases actually notified was 47. The odds against such an excess being due to chance are greater than 1000 to 1. It is concluded that ankylosing spondylitis predisposes to the development of pulmonary tuberculosis.

We wish to thank the chief medical officer of the Ministry of Pensions and National Insurance for providing access to the relevant war-pension records and for permission to publish the data extracted from them.

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LEUKÆMIA AND PULMONARY TUBERCULOSIS

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THE occurrence of pulmonary tuberculosis and leukæmia (or a leukæmia-like blood-picture) in the same patient has long been recognised. Rosenthal (1956) reviewed the subject, and put forward the view that many patients thought to have a leukæmoid reaction probably had in fact leukæmia. He said that the prevalence of the association of the two diseases was unknown, and we have been unable to find any evidence in the literature on which an estimate of it could be based. We have recently investigated the incidence of pulmonary tuberculosis in our series of ankylosing spondylitics and found a significant excess of tuberculosis arising after the onset of spondylitis (Lea and Abbatt 1957). Since the series also contained a significant excess of deaths from leukæmia, the possibility of a causal connection between pulmonary tuberculosis and leukæmia had to be considered.

Material and Methods

The material consists of all cases of leukæmia in members of the Armed Forces for which a pension was claimed from the Ministry of Pensions and National Insurance. Its advantages and drawbacks have previously been discussed (Lea and Abbatt 1957). It has now been extended to include those cases of leukæmia for which a pension was claimed during 1956, and covers the period Sept. 3, 1939, to Dec. 31, 1956, and is composed of 691 cases.

Such a series is particularly suitable for comparative cohort analysis (Case and Lea 1955), since it is a "closed" series. By this is meant that the date on which each individual in the series came under observation (i.e., joined the Forces) is known, and the date of his death or the fact that he was alive at the closing date of the investigation. From data of this type it is simple to find the number of man-years lived by the series in each year of the investigation, at each appropriate age-group. It is then only necessary to obtain a rate of incidence of pulmonary tuberculosis in the general male population for the same years and age-groups, to multiply each rate by the corresponding number of man-years lived, and by summation obtain the number of cases of pulmonary tuberculosis expected to appear in the series. Such a procedure proposes the hypothesis that the incidence of pulmonary tuberculosis in the general male population does not differ from the incidence in a population who all eventually develop leukæmia (the "null" hypothesis). It then remains to show whether or not the actual incidence of pulmonary tuberculosis in the leukæmia series differs significantly from the expected incidence.

It is clear that the death-rates from pulmonary tuberculosis are useless for our purpose, for patients who died from this disease before developing leukæmia will obviously not appear in the series. The Registrar General (1956) gives a table of the notifications of pulmonary tuberculosis per 100,000 living, by sex and age, for the years 1938 to 1953 inclusive. For the years 1954 to 1956 we have used the rates given for 1953, since this year is, at present, the last for which tables have been issued. As the years 1954–56 contain only 3% of the man-years lived by our series, this assumption can make no appreciable difference to the result.

Results

A total of 4022·5 man-years was lived by the series, and 6·1 cases of pulmonary tuberculosis would be expected to be notified on the hypothesis that the rate for the series did not differ from that for the general male population. (Because of the frequency of mass miniature radiography, it is probable that the ascertainment of pulmonary tuberculosis is more complete in the Forces than it is in the general population.) The number of cases of pulmonary tuberculosis found in the series was 7 (all of whom died), a very good agreement with the expected number. The probability of obtaining 7 or more cases when 6·1 were expected was found to be 0·41—i.e., an excess of 1 case was expected by chance 4 times out of 10.

Our evidence thus provides no support whatever for the possibility of pulmonary tuberculosis being a factor in the production of leukæmia. We conclude that the development of leukæmia in cases of pulmonary tuberculosis is coincidental—a not unexpected finding in view of the prevalence of pulmonary tuberculosis.

Summary

The method of comparative cohort analysis has been applied to a series of 691 cases of leukæmia. It was found that the number of notifications of pulmonary tuberculosis in the series was in good agreement with the number expected. It is concluded that the association of pulmonary tuberculosis and leukæmia is coincidental, and that there are no grounds for suggesting a causal relationship between the two diseases.

The investigation has been carried out under the auspices of the Medical Research Council's working party on leukæmia research.

We are indebted to Dr. R. A. M. Case, Prof. J. S. Mitchell, Dr. C. A. B. Smith, and Prof. L. J. Witts for helpful advice and criticism in the preparation of this paper, and to the chief medical officer of the Ministry of Pensions and National Insurance for permission to publish data taken from the records of the Ministry.

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COMPARISON OF CARDIAC AND PYLORIC SPHINCTERS

A MANOMETRIC STUDY

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THE relation between structure and function at the œsophagogastric junction and at the pylorus presents an intriguing paradox. It is difficult to explain the mechanism of the former without postulating a physiological sphincter which closes off the œsophagus from the stomach, yet an anatomical sphincter has never been demonstrated convincingly. The pyloric sphincter, on the other hand, is a well-defined anatomical structure, yet there is some doubt whether it functions physiologically as a sphincter which closes off the stomach from the duodenum.

It is not possible to establish the presence of a sphincteric mechanism by radiological methods alone, but measurements of intraluminal pressures should provide conclusive evidence. Dornhorst et al. (1954) used both methods simultaneously to study the cardia and concluded that "its behaviour is unlike that of known smooth-muscle sphincters, and favours the existence of some form of flap or funnel valve." But Fyke et al. (1956) found a segment of high pressure interposed between œsophagus and stomach which "has all of the physiologic characteristics of a sphincter."

Our own observations on the œsophagogastric junction agree closely with those of Fyke et al. We have in addition recorded the intraluminal pressures across the pylorus to determine whether the pyloric "sphincter" also constitutes a physiological sphincteric mechanism. The technique is described in detail because the main problem has been to identify the exact site of the pylorus. We have been unable to find any evidence of a physiological sphincter.

Method

The pressures developed within the lumen of the gut have been measured with fine air-filled polyethylene tubes connected to a multichannel recording system as previously described (Rowlands et al. 1953). The recording tips of the tubes consisted of an open-ended segment of radio-opaque rubber tubing 4 cm. long and 2 mm. in internal diameter. A liner of 'Perspex' 8 mm. long was inserted into the open tip and expanded the internal diameter to 2·5 mm. and the external diameter to 5 mm. Three, or four, tubes were lashed together so that the open tips were 4 cm. apart. With these expanded tips the change in volume produced in the system by a pressure of 100 cm. of water is 0·065 ml.

In studying the œsophagogastric junction, the tube was swallowed until the proximal tip lay just below the diaphragm; then, with the subject either sitting or supine, the tube was withdrawn in 1 cm. steps until the most distal recording tip had passed through the œsoph-

agogastric junction into the œsophagus. In the œsophageal studies the exact times of initiation of swallows were registered by recording the upward movements of the thyroid cartilage using two small balloons strapped to the front of the neck and connected to a channel on the recording machine. In studying the pylorus, the tube was passed into the duodenum with the patient lying on an X-ray table. It was then withdrawn in short steps into the body of the stomach under fluoroscopic control.

Open-ended tubes were found, however, to have certain disadvantages for studying the pylorus, where they were liable to become blocked by viscid mucus or by particles of food, whereas in the region of the œsophagogastric junction blocking rarely occurred. This tendency for the tube to become blocked could easily be prevented by injecting a continuous stream of air through the tube at a rate of 6 ml. an hour. This has been done routinely in studying pressure changes in the body of the stomach or intestine because it does not affect the pressures in such large cavities; but we found that even this slow rate of flow of air created artefacts difficult to interpret when the tube was in a narrow channel. Moreover it is difficult to position the tip of an open-ended tube accurately in the pyloric canal. At the œsophagogastric junction it was a simple matter to position the open-ended tube within 1 cm. or so by advancing or withdrawing it the required distance. This technique, however, was only partially successful at the pylorus, because the loop of the tube in the stomach was slack and mobile and

Fig. 1—Chain of four overlapping balloons on two double-channelled polyethylene tubes terminating in a radio-opaque rubber tube.

therefore could not be controlled with precision. Moreover it was impossible to locate the exact site of the pyloric "sphincter" fluoroscopically in fasting subjects, whereas after giving barium it was very hard to see the open-ended tip. For these reasons it was evident that open-ended tubes were not ideal for recording pressures across the pylorus. We therefore explored the possibility of using a chain of small balloons instead.

We are well aware of the limitations of the traditional balloon-water-manometer system for studying motility (Rowlands 1952); and indeed it was for this reason that we developed our modification (Rowlands et al. 1953) of Brody and Quigley's (1951) open-tube method of measuring intraluminal pressures. However, in the course of that work we recorded pressures from contiguous lengths of small intestine simultaneously with an open-ended tube and with a balloon of less than 1 ml. capacity, both recording on a metal-capsule optical manometer: the pressure waves were almost identical qualitatively and quantitatively. We therefore decided to use balloons of the smallest volume necessary to provide sufficient air to drive the recording system over the range of pressures commonly registered by open-ended tubes. This condition was satisfied by balloons 1·5 cm. long with a maximum diameter of 6·5 mm. at atmospheric pressure. The balloons were tied on polyethylene tubes of 0·5 mm. bore and used approximately half-full, containing 0·25 ml. of air. In this way we eliminated one of the principal objections to the traditional type of balloon—i.e., it constitutes a large foreign body. As with all balloons,

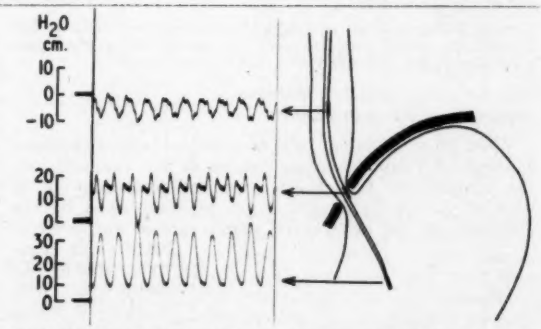

Fig. 2—Simultaneous tracings from three open-ended tubes with recording tips (1) in œsophagus, (2) at level of diaphragmatic hiatus, and (3) in fundus. Direction of respiratory pressure swings indicates position of recording tip in relation to diaphragm. Note biphasic inspiratory swing at level of diaphragm.

the elastic recoil of the rubber wall resists distortion of the balloon by external compression, and this resistance is more pronounced with such tiny balloons and increases as the balloon is emptied. The system was calibrated by lowering the balloons into a column of water, and the response of the whole recording system was found to be linear in the range of pressures commonly encountered (up to 80 cm. of water).

The chief value of a balloon-covered tip was that pressures could be recorded with certainty at all points across the pylorus without the necessity of localising the anatomical pyloric sphincter radiologically. This was achieved by tying four balloons alternately on to two double-channelled polyethylene tubes with the tapering ends of the balloons overlapping so as to form a continuous pressure-sensitive cylinder 5 cm. in length and 7 mm. in diameter (fig. 1). Any centripetal compression of this chain of balloons would therefore be recorded, and the chain was long enough to ensure that some part of it must be within the so-called pyloric sphincter during withdrawal of the tube from the duodenum into the body of the stomach either in successive steps or by continuous pull-through. The terminal portions of the polyethylene tubes distal to the balloons were ensheathed in radio-opaque rubber tubing which formed a stabilising tail 15 cm. long. A radio-opaque marker was also placed at the proximal end of the chain of balloons.

The normal state was studied in healthy students and medical staff. For studies of the œsophagogastric junction the subjects were fasting, but pressures were measured at the pylorus both when the stomach was empty and when it contained mixtures of barium sulphate and food such as fried fish and potatoes, thick semolina pudding, or a mixture of boiled rice, chopped nuts, raw apple and fried bacon. A number of studies of the pyloric region have also been made in patients with active duodenal ulcers and non-ulcer dyspepsia and in one patient with hypertrophic pyloric stenosis. These patients were all fasting and were not studied after meals.

The tube was withdrawn or advanced under fluoroscopic control, and peristaltic activity could be seen over the main mass of the barium-food mixture; but the passage

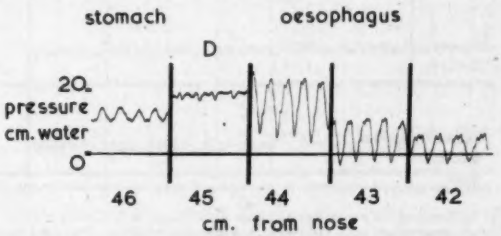

Fig. 3—Tracings of pressures at different levels as open-ended tube is withdrawn in 1-cm. steps from stomach into œsophagus, showing segment of higher pressure at level of diaphragm (D) and in lower end of œsophagus.

of each bolus of food through the pyloric region into the duodenum could not be seen in detail with the low-intensity radiation used (0·6–0·8 mA at 75 kV).

Results

Œsophagogastric Junction

When an open-ended tube or a balloon was withdrawn in steps of 1 cm. from the fundus of the stomach into the œsophagus, the position of the recording tip in relation to the diaphragm could be determined by the direction of the inspiratory swing, which was positive below and negative above the diaphragm, with a biphasic swing at the diaphragm itself (fig. 2).

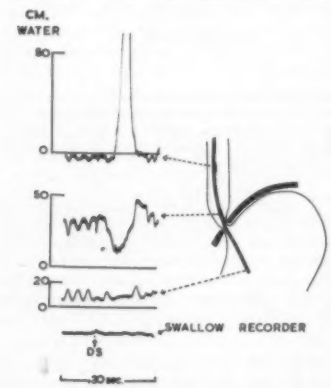

Fig. 4—Simultaneous tracings from three open-ended tubes with recording tips (1) in œsophagus, (2) in segment of higher pressure, and (3) in stomach. When the subject swallows (DS, dry swallow), pressure falls in segment of higher pressure before peristaltic wave appears in œsophageal tracing.

In the region of the œsophageal hiatus of the diaphragm the pressure rose over a distance of 1–4 cm., the extent above and below the diaphragm being variable. The upper limit of this segment of higher pressure was usually about 2 cm. above the diaphragm and was always clearly defined by a fall in pressure to the general intra-œsophageal level (fig. 3). The lower limit of the segment was either at the level of the diaphragm or up to 1 cm. below it. During a swallow the pressure in this segment fell to about the general intra-œsophageal level, indicating that the segment of higher pressure represented a tonically contracted sphincter (fig. 4), which relaxed as part of the swallowing reflex. This sphincter has been demonstrated consistently in all experiments on each of eighteen normal subjects and in patients without evidence of hiatus hernia or free gastro-œsophageal reflux.

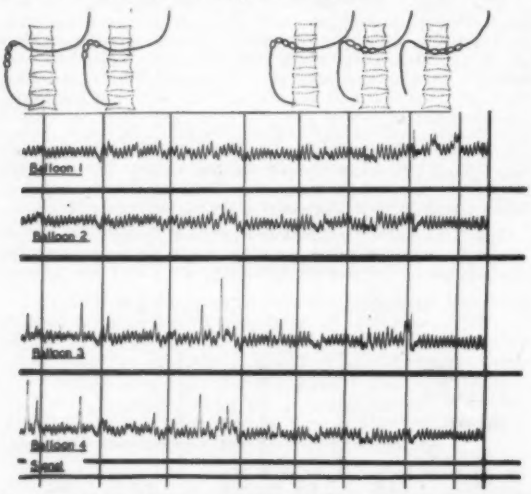

Fig. 5—Tracings of pressures as chain of balloons is withdrawn in steps from duodenum into stomach in a normal subject. Balloons numbered 1-4 from proximal to distal. Vertical lines indicate where recording was stopped while tube was withdrawn to positions indicated in uppermost register. No balloon shows sustained rise of pressure as it passes through pyloric region.

Pylorus

An open-ended tube was withdrawn from the duodenum into the body of the stomach in short steps 29 times in eighteen normal fasting subjects and 7 times in five of these when food was present in the stomach. A balloon-covered tip was similarly withdrawn 40 times in seven subjects and 23 times in six of these when food was present in the stomach (fig. 5). In contrast to the results obtained at the œsophago-gastric junction, in no instance could a band of increased pressure be demonstrated anywhere in the region of the duodenal cap, pyloric canal, or pyloric antrum with either an open-ended tube or a balloon chain. It was possible to correlate peristaltic waves in the body and antrum with the pressure records, but the passage of the food through the pyloric region could not be seen clearly.

Fig. 6—Radiograph showing ulcer in pyloric canal. A sustained rise of pressure could not be demonstrated by withdrawing either a chain of balloons or an open-ended tube from duodenum into stomach.

Similar results were obtained in three patients with active duodenal ulceration, in one patient with an ulcer in the pyloric canal (fig. 6), and in a patient who subsequently had a gastrectomy for hypertrophic pyloric stenosis (figs. 7 and 8). None of these showed a segment of increased pressure in the gastro-duodenal region when fasting; records were not obtained in these patients with food present in the stomach.

Fig. 7—Radiograph showing hypertrophic pyloric stenosis in adult.

Although phasic pressure waves were recorded simultaneously from the four balloons covering a 4–5-cm. segment of gut in the pyloric region on many occasions (figs. 9 and 10), no convincing evidence of independent contraction was found in the region of the gastroduodenal junction either in the normal subjects or in the patients. It is evident from the records obtained by these techniques that for the greater part of the time the lumen of the so-called pyloric ring or sphincter is more than 7 mm. in diameter, whether the stomach is empty or contains food. To verify this concept a series of holes having diameters of 6·5, 7·0, 7·5, 8·5, and 9·0 mm. were bored through a

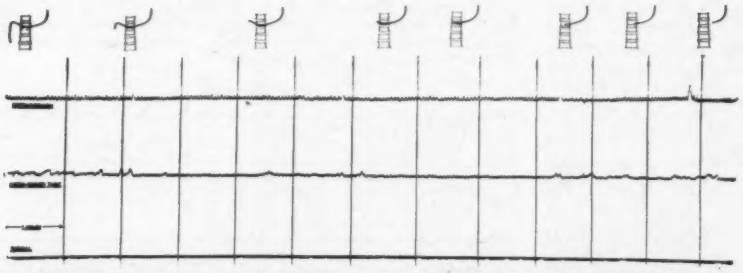

Fig. 8—Same patient as fig. 7. Tracing of pressure as open-ended tube is withdrawn in steps from duodenum to stomach. Upper tracing is stethograph record; middle tracing is pressure record; and lower horizontal line is signal. Vertical lines indicate minute intervals. There is no significant change in pressure as open-ended tube is withdrawn in steps, as indicated in small diagrams above.

block of wood 25 mm. thick, and the balloon chain was pulled through each in turn. No increase of pressure was recorded in passing through the 9·0-mm. and 8·5-mm. holes, but a pressure of 5 cm. of water was produced when the balloon chain was pulled through the 7·5-mm. hole, suggesting that the chain will detect a constriction of the lumen of the gut to 7·5 mm. at least.

Discussion

Our observations on the œsophagogastric junction are in close agreement with those of Fyke et al. (1956) and Botha et al. (1957). The high pressure at the œsophagogastric junction is presumably due to tonic contraction of circular muscle-fibres, since during the act of swallowing the pressure falls several seconds before the peristaltic wave reaches the junction. This transient fall in pressure correlates radiographically with the time during which the œsophagogastric junction is open (Atkinson et al. 1957b). A flap or funnel valve could not explain a mechanism of this kind, which strongly suggests the presence of a sphincter which relaxes as part of the swallowing reflex. The diaphragm itself could hardly account for a segment of high pressure which extends for several centimetres into the thorax, and moreover we have demonstrated it in patients with a large fixed hiatus hernia, where the œsophagogastric junction lies several centimetres above the level of the diaphragm (Atkinson et al. 1957a). Hence it seems necessary to postulate an intrinsic sphincter despite the absence of an anatomical sphincter.

In contrast, we were unable to demonstrate a sphincteric mechanism at the site of the anatomical pyloric sphincter. Although the exact site of the gastroduodenal junction could not always be identified, the continuous chain of balloons could not have failed to demonstrate the presence of a physiological sphincter, in the sense of a tonically contracted muscular ring keeping the lumen tightly closed and relaxing during the passage of gastric contents into the duodenum. The phasic pressure waves recorded from the pyloric channel from time to time must have resulted from obliteration of the lumen, partial or complete; but this closure is intermittent and brief and occurs as part of a contraction which periodically involves the whole pyloric region (fig 9). We never recorded an independent sustained contraction from one part of the pyloric channel only, and we found no evidence that the pylorus acted antagonistically to peristaltic or other phasic pressure ranges by shutting down and remaining closed during successive contractions of the antrum. For the greater part of the time, therefore, the bore of the pyloric channel must have been at least 7 mm.; we could not assess accurately the size of the lumen above this figure.

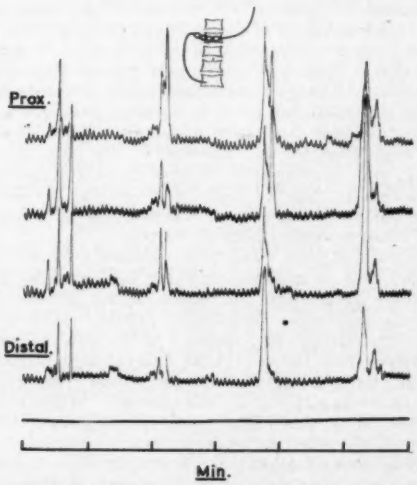

Fig. 10—Tracings of pressures recorded from four balloons lying across gastroduodenal junction as indicated in diagram above. Phasic pressure waves occur almost synchronously in all four recording channels.

Fig. 9—Phasic pressure waves recorded from three balloons lying across gastroduodenal junction as indicated in diagram above.

This apparent discrepancy between structure and function at the pyloric sphincter is probably false. Torgersen's (1942) careful dissections showed that the anatomical sphincter is simply the distal ring of muscle at the apex of the funnel of thickened circular muscle-fibres surrounding the terminal 3 cm. or so of the pyloric region. This segment of thickened muscle probably contracts simultaneously along its whole length, as suggested by Cole (1928, 1932), in contrast to the peristaltic contractions of the body of the stomach and antrum. This concept of a systolic rather than a peristaltic type of contraction would explain some of our tracings which show bursts of phasic pressure waves occurring almost synchronously in all recording channels from a segment of gut 3–4 cm. in length. Fig. 10 shows a series of such waves, each lasting about 15 sec. and occurring about every $1^1/_2$–2 minutes. These systolic contractions must reduce the bore of the pyloric canal or close it momentarily and would have the effect of squeezing a portion of the

gastric contents forwards into the duodenum and of forcing the remainder back into the stomach. The amount, if any, which passed into the duodenum would depend partly on the viscosity of the contents, and any large solid particles would tend to be held up in the contracting segment or proximal to it. This concept makes the pyloric channel a combined pump and filter rather than a sphincteric mechanism.

Nevertheless it came as a surprise to us to find that the pylorus, unlike the cardia, is normally relaxed. On clinical, radiological, and anatomical grounds we had imagined that the pyloric sphincter is often, if not usually, tightly contracted, relaxing only from time to time to permit gastric contents to pass into the duodenum. We tried to induce sustained contractions by feeding a variety of indigestible foodstuffs, including nuts and lumps of coarse meat, but without success. Moreover we have not yet demonstrated a sphincteric mechanism even in patients with active duodenal ulcers; but only a few studies have been made so far and all on fasting patients. In none of these patients have we seen either sustained tonic contractions or pressure waves of unusual frequency or amplitude in the antrum or pyloric region. The failure to demonstrate a physiological sphincter in the patient with hypertrophic pyloric stenosis is also surprising, since the symptoms in this disease are presumably related to some degree of delay in gastric emptying, even in those patients with complicating ulcers. A possible explanation is that, in hypertrophic pyloric stenosis, the pyloric channel forms a relatively fixed structure which does not contract and relax to squeeze gastric contents into the duodenal cap in the usual way (Keet 1952). If the pyloric channel did not relax fully, its diastolic capacity, and consequently its systolic output, would be much reduced; but we could not test this hypothesis, because our recording system will not register relaxation of the lumen beyond a bore of 7·5 mm.

A disorder of this kind, from whatever cause, would delay the rate of gastric emptying and tend to inhibit the passage of anything but liquid chyme, producing the symptoms and signs commonly attributed to pylorospasm. The concept of "spasm" of the pylorus presumably derives from the belief that a physiological sphincter exists at the pylorus, but our preliminary observations lend little or no support to this concept. While it would be premature to deny that pylorospasm occurs, there is some evidence that the concept has been grossly overworked as an explanation for a variety of symptoms in ulcer and non-ulcer dyspepsia. However, further studies are required on a large series of patients, during the passage of a variety of foodstuffs through the gastroduodenal junction, using a combined manometric and cineradiographic method.

Summary

Pressures in the lumen of the human œsophagogastric and pyloric regions were measured with an air-filled recording system and open-ended tubes or miniature balloons.

By these means the presence of a physiological sphincter, which relaxes as an integrated part of the swallowing reflex, was demonstrated at the œsophagogastric junction, in spite of the absence of an anatomically defined sphincter. Evidence is adduced that the sphincter is independent of the diaphragm.

In contrast, at the pylorus, where the presence of an anatomical sphincter is accepted, no manometric evidence of a sphincteric mechanism was found in normal subjects (either fasting or with food in the stomach), or in patients with duodenal ulcers, or in an adult with hypertrophic pyloric stenosis.

Since there does not appear to be a tonically contracted sphincter closing off the pyloric lumen, it is possible that the rate of gastric emptying is regulated by a combined filtration and pumping mechanism in this region.

We wish to thank Dr. K. E. Harris for allowing us to use the X-ray facilities of the cardiological department, and Prof. M. L. Rosenheim for allowing us to investigate the patient with hypertrophic pyloric stenosis.

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PROGNOSIS IN SUBACUTE BACTERIAL ENDOCARDITIS

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ALTHOUGH the infection in subacute bacterial endocarditis can be controlled in nearly all cases, many patients with this disease still die from its sequelæ, particularly intractable congestive heart-failure. It is my purpose to show the relatively poor prognosis which this disease still has and to discuss some of the factors involved.

Material

The series consists of 29 cases of subacute bacterial endocarditis treated with penicillin during 1946–54 in which the diagnosis was confirmed by blood-cultures or necropsy. They form part of a larger series previously reported (Wedgwood 1955). 30 patients were treated during the period reviewed but 1 cannot be traced. The average period of follow-up in the living patients was three years four months, the range being nine years six months to one year eight months.

Patients were treated on routine lines with aqueous penicillin by injection, usually at six-hourly intervals. In all cases, except a few treated early in the series, at least 2 million units of penicillin was given daily for six weeks, the dose being increased when necessary to 10 million units daily. In addition 2 patients were given streptomycin, 2 intermittent sulphonamide courses, and 6 aureomycin or chloramphenicol.

Positive blood-cultures were obtained in all cases except 1. *Streptococcus viridans*, *Str. hæmolyticus* Lancefield group H or F, or unclassified non-hæmolytic streptococci were grown in 21 cases; *Str. hæmolyticus* Lancefield group D in 4 cases; *Hæmophilus influenzæ* in 2 cases; and *Staphylococcus albus* in 1 case.

In 6 cases, including 3 with *Str. hæmolyticus* Lancefield group D and 2 with *H. influenzæ*, there was some in-vitro penicillin resistance, but this was never extreme. There was sometimes difficulty in choosing the most suitable course of treatment, but failure of the infection to respond to treatment did not appear to be a cause of death in any case.

The patient with a sterile culture died. 3 other clinically diagnosed patients with sterile cultures, treated during the same period, also died; they were excluded from the series because the diagnosis could not be confirmed by necropsy.

Results

11 (38%) of the 29 patients died. 11 (38%) appear to be worse than before their illness, and only 7 (24%) do not appear to have deteriorated.

TABLE I—NO. OF DEATHS ACCORDING TO VALVULAR LESION AND AGE

Age (yr.)	Aortic alone or aortic + mitral		Mitral alone		Congenital heart-disease		Total	
	Survivors	Dead	Survivors	Dead	Survivors	Dead	Survivors	Dead
0–20	1	0	2	0	1	0	4	0
21–40	2	4	2	0	2	0	6	4
41–60	0	2	3	1	0	1	3	4
Over 60	1	0	4	3	0	0	5	3

The series contained a high proportion of males—21 patients (71%). 7 male and 4 female patients died. The average age in the series was 45 (males 43, females 49), and 8 patients (29%) were over 60. The youngest was aged 8 years and the eldest 81. The mortality tended to be highest in the middle-aged and older patients (table I).

8 patients died of congestive heart-failure within two years of the start of treatment (average ten months), apparently because of severe valvular and possibly myocardial damage sustained during their infection. 1 patient died of a subarachnoid hæmorrhage two weeks after starting treatment. In 2 patients the cause of death was not certain but was possibly due to late embolic episodes.

The prognosis did not seem to be affected by the type of organism. There has been only 1 relapse or reinfection in the series.

The site of valve-disease affected the prognosis (table II). 10 patients had predominant aortic incompetence, 5 with signs of mitral disease as well; 6 of these died from heart-failure. 15 patients were thought to have mitral-valve disease alone, of whom 14 had signs of solitary or predominant mitral incompetence; 4 of these died, 2 from heart-failure. 4 patients were thought to have congenital heart-disease, 3 with ventricular septal defects and 1 with a patent ductus arteriosus; 1 of those

TABLE II—NO. OF DEATHS ACCORDING TO LESION AND SEX

Lesion	Aortic alone		Aortic + mitral		Mitral alone		Congenital heart-disease	
Sex	Survivors	Dead	Survivors	Dead	Survivors	Dead	Survivors	Dead
Male	2	3	1	3	9	1	2	0
Female	0	0	1	0	2	3	1	1
Total	2	3	2	3	11	4	3	1

with a ventricular septal defect died of congestive heart-failure and tricuspid incompetence. Patients with bicuspid aortic valves were included in the aortic group of cases and not with those with congenital heart-disease.

The diagnosis of the valvular lesion was based on clinical findings and confirmed by necropsy in 6 cases. At necropsy 2 of the patients with aortic incompetence were found to have ruptured or perforated cusps and 1 a bicuspid aortic valve.

Of the 4 surviving patients with aortic lesions 3 are much worse than before their illness; they have signs of free aortic regurgitation and large hearts. About two-thirds of the surviving patients with mitral lesions are worse; about a third (4 patients) are severely incapacitated, with moderate or gross cardiac enlargement and signs of severe mitral regurgitation. In contrast, the 3 surviving patients with congenital heart-disease do not appear to have deteriorated as a result of their illness.

18 patients had no cardiac symptoms before their illness; only 4 of these have no symptoms now, and 6 have died. A further 8 patients had slight symptoms only; only 1 of these has not deteriorated, and 5 are dead. 3 patients had moderately severe cardiac symptoms; in 2 the symptoms are unchanged. None of the patients was severely incapacitated or had congestive heart-failure before their infection.

The average duration of illness before treatment was started was twelve and a half weeks (maximum thirty-one weeks, minimum two weeks). The mortality tended to be higher in the patients who had been ill the longest, but there was much variation from case to case in the rate of progress of the disease, and the association between length of illness and mortality was not uniform. Variation in the duration of the disease was greatest in patients with aortic-valve lesions in whom the duration of illness varied from two to thirty-one weeks in the fatal cases and from four to twenty weeks in the surviving cases. In the mitral group the association between length of illness and mortality was slightly more constant, but the

TABLE III—NO. OF DEATHS ACCORDING TO VALVULAR LESION AND DURATION OF SYMPTOMS

Duration (weeks)	Aortic alone or aortic + mitral		Mitral alone		Congenital heart-disease		Total	
	Survivors	Dead	Survivors	Dead	Survivors	Dead	Survivors	Dead
0–9	2	3	5	1	2	0	9	4
10–19	1	1	5	2	1	1	7	4
20–29	1	1	1	1	0	0	2	2
30–39	0	1	0	0	0	0	0	1
Average	12·7	13·0	12·5	13·8	9·3	12·0	12·0	13·2

range was eight to twenty-four weeks in the fatal cases and five to twenty-nine weeks in the survivors (table III).

Congestive heart-failure, cardiac enlargement, and auricular fibrillation were all associated with a poor prognosis. 3 patients had signs of congestive failure on admission, and all died. Of 10 patients with moderate or gross cardiac enlargement, 6 died. Of 19 patients in whom the heart was of normal size or only slightly enlarged, only 5 died. 1 patient had persistent auricular fibrillation on admission; and in 2 patients this developed during treatment. Paroxysmal auricular fibrillation developed during treatment in 4 patients. 6 of the 7 patients with auricular fibrillation died.

Electrocardiographic signs of myocardial damage were found in 5 cases—non-specific T-wave changes in 4 cases and signs of anteroseptal infarction in 1 case. 2 of these 5 patients died.

The individual symptoms before admission to hospital did not appear in general to influence prognosis, except when they were associated with congestive failure or severe embolism. Paradoxically, severe symptoms, particularly those of embolism, might be beneficial in that they expedited the recognition of the disease.

The fatal cases had a slightly higher incidence of café-au-lait pallor and splenic enlargement than the rest of the series, but other physical signs were found with about the same frequency in the fatal cases as in the series as a whole (table IV). More classical signs tended

TABLE IV—DEATHS ACCORDING TO PHYSICAL SIGNS

Sign	Whole series		Fatal cases	
	No.	%	No.	%
Fever	28	96	10	92
Heart murmur	28	96	10	92
Embolism	14	48	5	45
Petechiæ	14	48	6	55
Palpable spleen	13	45	8	73
Café-au-lait complexion	16	55	8	73
Clubbing	17	59	7	64
Emcipation	10	35	4	36
Congestive failure	3	10	3	27
Anæmia	5	17	4	36
Red-cells in the urine	13	45	6	55

to develop in the fatal cases than in the others. Three or more signs were present in 16 patients, of whom 8 died; two or less were present in 13 patients, of whom 3 died. This was chiefly due to the high incidence of classical signs in the patients with aortic-valve lesions; but in 2 fatal cases there were no classical signs.

Anæmia (hæmoglobin less than 10 g. per 100 ml. in men or 9 g. per 100 ml. in women) was found in a higher proportion of fatal cases than of the rest of the series. Microscopic hæmaturia was also more common in the fatal cases.

The patients' temperature-charts showed three main types of response to treatment. 13 patients had an immediate and sustained reponse; of these 6 (46%) died. 5 had an immediate response, followed by a secondary rise and a low-grade fever which persisted until treatment was discontinued; none of these died. In 11 patients the response was delayed over one or two weeks, and there was often difficulty in deciding the best course of treatment; 5 (45%) of these died.

Discussion

The mortality among patients with subacute bacterial endocarditis whose infection appeared to be controlled was about 35% in the Medical Research Council penicillin trials (Christie 1948, Cates and Christie 1951). At first it seemed possible that the prognosis could be improved with more satisfactory courses of antibiotics and, in particular, by earlier diagnosis and treatment (Jones et al. 1947); but subsequent series of cases, with occasional exceptions (Matthew 1950), have not shown any great improvement on the earlier figures. Donzelot et al. (1953) in a review of 202 cases found an immediate mortality of 24% and a total mortality, over a period of one to seven years follow-up, of 35%. Newman et al (1954), in a series of 39 treated cases of bacterial endocarditis of both acute and subacute types, found that 31% died of the infection. Of the survivors, a third died with congestive heart-failure, a third were disabled, usually by congestive failure, and only a third (or 9 of the original 39 cases) were alive and symptom-free. Rather similar results were found by Mendelson et al. (1956). Some (Smith and Priest 1954, Priest and Smith 1955) believe that the outlook is better than this, but the majority view is that about a third of the patients, cured of their infection, die of heart-failure (Christie 1953).

The present series is too small to be conclusive, but its results are very similar to those of the workers cited and add further support to existing evidence of the relatively poor prognosis in the disease in spite of treatment.

Failure to cure the infection itself does not now seem to be a common cause of death. In most cases the infection can be controlled by appropriate combinations of drugs, particularly penicillin and streptomycin.

Attempts to improve the prognosis by early diagnosis have not been as successful as was at first hoped. Early diagnosis is often difficult, because the symptoms are deceptively mild. There is also evidence that the infection may be present without symptoms. Some cases of the disease appear to have advanced physical signs, particularly finger-clubbing and splenic enlargement, which seem out of proportion to the length of the history. It is probable that these patients have had the infection longer than their symptoms. Cleland et al. (1956) found vegetations, probably due to bacterial endocarditis, in the aorta at operation on 8 patients with coarctation. In 4 of these there had been no suspicion of infective endoaortitis.

Cates and Christie (1951) showed that duration of symptoms before treatment clearly affected prognosis; but not all later series have given numerical evidence of this relationship. This is probably explained by the wide variation between individual patients in the rate of progress of the disease.

The results in the present series showed some correlation between duration of illness and mortality, but this was not striking. The numbers are too small to be conclusive, but the results suggest that early diagnosis is not necessarily associated with a good prognosis, particularly in cases with aortic-valve lesions.

The patient's age, the site of valve-disease, and the presence of congestive heart-failure or evidence of gross loss of weight seem to be important factors in prognosis (Cates and Christie 1951). In the present series, as in many others, the site of the valve-disease appeared to have a predominant influence on the outlook. Geiger and Durlacher (1947) emphasised the serious results of the gross valvular disease after treatment when the aortic valve has been infected. Cates and Christie (1951) found the mortality among patients with aortic, aortic plus mitral, mitral, and congenital heart-disease respectively was 57%, 58%, 43%, and 24%, when cases with bicuspid aortic valves were included in the aortic and mitral groups. The poor outlook in the patients with aortic-valve lesions was confirmed in the present series. The results in the patients with mitral-valve disease were a little better, but the mortality and especially the morbidity were high. The results in patients with aortic-valve and mitral-valve lesions were in striking contrast to their symptomless condition before infection. In patients with congenital heart-disease the prognosis appears relatively good, if the patients with bicuspid aortic valves are excluded.

The disappointing results of even early treatment suggest that prophylaxis is of greatest importance, as Horder (1909) first emphasised. Patients with valvular or congenital heart-disease should be protected from the bacteræmia following operations by appropriate antibiotic cover. Protection is particularly important for operations on the teeth, tonsils, and genito-urinary tract, and during childbirth. With occasional exceptions, penicillin is the drug of choice. Growth of penicillin-resistant organisms is encouraged if penicillin is given for too long before operation (Cates et al. 1951) and the first injection should precede operation by a short time only (Garrod 1953).

Recognition of the patients who need prophylaxis may be difficult. About half the patients in this series did not suspect that they had heart-disease before their infection (Wedgwood 1955). But recognition of mild valvular disease will probably become more common with present-day interest in these conditions. A particular problem is the patient with an "innocent" systolic murmur. At least 1 patient in this series probably had no more than a soft mitral systolic murmur before his infection. This may also have been the case in others who had been carefully examined before their infection and considered not to have heart-disease. Brigden and Leatham (1953) have emphasised that a late systolic murmur may be followed by bacterial endocarditis. The possibility that the disease may develop in a patient with a functional systolic murmur is very important, and these patients should be strongly considered for penicillin prophylaxis.

Recognition of early evidence of aortic incompetence is also important, and similar precautions should be taken in these cases.

Unfortunately a definite focus of infection cannot be found in many cases. Cates and Christie (1951) found no focus of infection in 38% of cases. A history of dental extraction or obvious dental sepsis was present in only 38% of the present series only. Awareness of the type of infection or procedures which precipitate the disease may improve on these figures.

The possibility that infections of the upper respiratory tract may precipitate subacute bacterial endocarditis in patients with valvular disease should perhaps be more often considered. Symptoms of upper-respiratory infection are common in the early stages and it is often

impossible to know whether they are due to the disease or precede it. In either case such symptoms in a patient with heart-disease should receive careful attention and the possibility be borne in mind of bacterial endocarditis or the need for prophylaxis.

Summary

29 cases of subacute bacterial endocarditis treated between 1946 and 1954 are reviewed.

Of the 29 patients 11 (38%) are dead, 11 (38%) are worse than before their illness, and only 7 (24%) do not appear to have deteriorated as a result of the illness.

Of the factors influencing prognosis, the site of the valve disease is particularly important, and the outlook is worst in patients with aortic-valve disease.

Prognosis is in general better in cases where treatment is begun early; but even then it may be bad, particularly in cases with aortic-valve lesions.

Early treatment is of great importance, but prophylaxis seems to offer the best chance of reducing the death-rate and morbidity from this disease.

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FATAL AGRANULOCYTOSIS DUE TO PROMAZINE HYDROCHLORIDE

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ALTHOUGH promazine hydrochloride ('Sparine') has been widely used in the U.S.A. as a tranquillising agent, it has only recently been introduced into this country. It is closely related to chlorpromazine ('Largactil'), differing only by the absence of one chlorine atom. Reports so far indicate that it does not produce jaundice, which chlorpromazine sometimes does.

One case of fatal agranulocytosis following the use of promazine hydrochloride in the U.S.A. has been reported (Woodward and Solomons 1956), but in this instance the dosage of promazine (1 g. daily) was very large by European standards. Six other cases of leucopenia have been communicated to the makers of sparine, but in most of these evidence incriminating it has been equivocal. Delayed agranulocytosis is mentioned by Morrison (1957), who was using up to 2 g. of promazine daily.

Promazine hydrochloride has been used in this hospital chiefly as an equally effective but less toxic substitute for chlorpromazine. The fatal case reported here was among the first twenty-five patients treated.

Case-report

A widowed schoolmistress, aged 53, was admitted to hospital on Dec. 27, 1956, in a state of acute agitation. She was depressed and complained of palpitations, sweats, insomnia, and anxiety. She had a delusion of pregnancy but soon gained insight into this. She had some vague paranoid ideas centred on her general practitioner. The onset was in February, 1956. She had had similar but milder illnesses in 1941, 1950, and 1953. She had been a nervous child and of anxious, sensitive, and overconscientious personality. Her marriage had been happy, but she had only borne one child, and that was stillborn. There was no family history of mental illness.

On examination she was so agitated that history-taking was very difficult. Her affect was appropriate. She was preoccupied with numerous hypochondriacal ideas, centred especially on heart-disease. She had numerous aches and pains, including recurrent sore throats. Complete physical examination revealed no significant abnormality. Her blood-pressure was 160/80 mm. Hg. Her urine contained sugar (orange colour with Benedict's solutions), but a fasting blood-sugar was only 106 mg. per 100 ml.

The diagnosis was finally considered to be agitated depression, although at the outset the possibility of early paraphrenia was considered.

Treatment and Progress.—Amylobarbitone sodium gr. 3 four-hourly did not control her agitation; so promazine hydrochloride was in addition administered in a dosage of 50 mg. t.d.s. by mouth from Jan. 3, 1957, onwards. She was too frightened of electroconvulsion therapy to agree to have it. Her agitation became gradually less, and a week before her death she was sufficiently composed to agree to electroconvulsion therapy, which, however, was never begun. On Jan. 13 she mentioned sore throat amongst numerous other aches and pains, but examination of the throat showed no abnormality. Subsequent examinations were also negative, and after a few days she no longer felt her throat sore. On Feb. 14 she again complained of sore throat and examination was still negative, but on Feb. 16 her throat was seen to be acutely inflamed, and her temperature rose to 104°F in twelve hours. Her pulse and temperature had been recorded six-hourly since admission, and this was the first time she had any pyrexia. The promazine was stopped, and long-acting penicillin ('Penidural') (10,000,000 units) was administered daily. On Feb. 18 aureomycin (0·5 g. six-hourly) was given.

Agranulocytosis.—Blood-films showed complete agranulocytosis with total white-cell counts diminishing from 1400 per c.mm. on Feb. 18 to 400 per c.mm. on Feb. 20. A throat swab taken on Feb. 18 grew a *Staphylococcus pyogenes* sensitive to aureomycin but not to penicillin. Her condition deteriorated until she died on the evening of Feb. 20, with a terminal hyperpyrexia of 105·6°F and signs of consolidation at the base of her right lung.

Necropsy Findings.—The myocardium was soft, and there were many petechial hæmorrhages on the surface of the ventricles. The base of the tongue, pharynx, and upper part of the larynx were acutely inflamed, with necrotic encrusted areas. The right lung was œdematous; the lower lobe of the left lung was consolidated. The liver had the appearance of acute toxic change. The spleen was $1^1/_2$ times its normal size, and the cut surface was soft and of acute septic type. The medullæ of the adrenal glands were unusually soft and semi-diffluent. The marrow of the middle of the shaft of the left femur was hyperplastic and dark red. The brain, alimentary tract, and kidneys showed no significant abnormality. Microscopy of sections of liver, kidney, heart, and bone-marrow confirmed the presence of agranulocytosis and the absence of leukæmia.

Discussion

The patient's previous history of sore throat possibly obscured the clinical picture and prevented early detection of developing agranulocytosis. On the other hand, the fulminating onset of her infection suggests that the agranulocytosis might have developed just as suddenly. Since the dosage given was small, acute sensitisation to the drug must be assumed. It is uncertain just how or why this takes place.

Several new tranquillising agents derived from phenothiazine have been introduced into psychiatry in the past four years. Chlorpromazine has an established place in psychiatry in spite of its known toxic effects. *The Lancet* (1957) cites 21 cases, 8 of them fatal. 'Pacatal' (N-methyl-piperidyl-(3)-methyl-phenothiazine), in spite of favourable reports, was considered by Mitchell et al. (1957) to be too toxic for general use. These drugs are

very valuable in disturbed and agitated schizophrenia, especially the paranoid variety, and here have often a therapeutic effect where insulin and leucotomy have failed. In many other cases they enable a patient to lead a happier and more normal life outside hospital, even if the illness is only being held in check by maintenance doses. They appear to be slightly more effective than reserpine and have not the disadvantage of producing depressive reactions or dangerous collapse, if a patient having the drug is given electroconvulsion therapy. There is no doubt, therefore, that the risks of toxic effects are amply justified in serious mental illness. One wonders, however, whether they should be given, as often happens, in the primary treatment of mild anxiety states, where they would seem to have little or no advantage over barbiturates.

Promazine hydrochloride has been used in about 30 cases in this hospital. My impression is that it is rather more effective than chlorpromazine, and a colleague considers it of equal benefit. It can be given intramuscularly without local reaction. The misfortune of agranulocytosis encountered so soon does not in any way condemn promazine. However, it is important to determine the least toxic of these drugs as well as which is the most effective.

If every case of serious toxic effect is published, it will be possible to obtain some idea of their comparative risks. Possibly some cases are missed, especially in old deteriorated patients in mental hospitals. They are easy prey to intercurrent infections; therefore agranulocytosis may not be thought of.

I wish to thank Dr. Stewart Smith for the pathological findings.

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EFFECT OF INTRAVENOUS ACETAZOLAMIDE ON CEREBROSPINAL-FLUID PRESSURE

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WITH the introduction of acetazolamide ('Diamox') in the treatment of epilepsy (Merlis 1954, Ansell and Clarke 1956), there has been considerable interest in the possible effect of this carbonic-anhydrase inhibitor on cerebral metabolism and on the formation of cerebro-spinal fluid (C.S.F.). There have been contradictory reports of its effect on the C.S.F. pressure of animals. Tschirgi et al. (1954) found a fall, whereas Knopp et al. (1957) noted a rise in the pressure after intravenous administration of acetazolamide. Because of this observation, Knopp et al. warned against clinical trials of the drug in patients with raised intracranial pressure. Parenteral acetazolamide is sometimes used in the treatment of status epilepticus; but, if there is any likelihood of raising intracranial pressure, the use of this drug should be avoided in epileptic patients in whom the diagnosis of a cerebral tumour has not been excluded. In view of the divergence of opinions, it was considered important to investigate this problem in man by observing the action on the C.S.F. pressure of intravenous acetazolamide in doses comparable to those usually administered.

EFFECT OF VARYING INTRAVENOUS DOSES OF ACETAZOLAMIDE ON C.S.F. PRESSURE

Case	Age (yr.)	Sex	Dose (mg. per kg.)	Initial C.S.F. pressure (mm. C.S.F.)		Maximum rise above initial mean pressure (mm.) C.S.F.
				Range	Arithmetic mean	
1	42	F	20	160–190	185	155
2	25	F	20	150–170	158	152
3	16	M	20	215–260	232	148
4	23	F	20	110–160	133	147
5	19	M	14	150–180	162	78
6	28	M	7	135–185	161	No rise
7	14	F	7	80–150	113	No rise

Methods

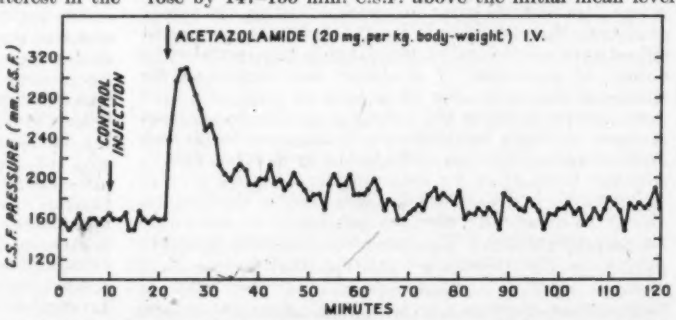
Seven epileptic patients were chosen on whom a lumbar puncture was being performed for purposes of diagnosis. Once it had been established that pressure and conduction were normal, the opportunity was taken of observing the effect of intravenous acetazolamide in different doses. Some of these patients had previously been given the drug for therapeutic reasons.

Lumbar puncture was performed with the patient in the right lateral position, using a 19-gauge needle connected directly to a manometer, 60 cm. long and 1 mm. in bore, care being taken not to allow any escape of C.S.F. Free communication with the subarachnoid space was confirmed by observing the normal pulsation of the fluid level. In some patients the pressure rose sharply after emotionally disturbing stimuli, such as a venepuncture. To minimise these influences a Gordh needle was introduced in the antecubital vein of the right arm, and subsequent injections were given through its rubber diaphragm. Heparin, up to a maximum of 5000 units, was used to prevent clotting in the needle.

A period of at least 20 minutes with the patient relaxed was allowed for the C.S.F. pressure to reach a stable level, readings being taken at 1-minute intervals. The blood-pressure and respiration-rate were recorded every 3 minutes, and in one patient respirations were counted every minute. Towards the end of this period of observation, a control injection of 5 ml. of distilled water was given to judge the effect of any resulting emotional factors. Acetazolamide was then rapidly injected intravenously: doses of 7, 14, or 20 mg. per kg. body-weight were administered to various patients in a concentration of 100 mg. per 100 ml. Recordings of C.S.F. pressure, blood pressure, and respiration-rate were continued for periods of 50–100 minutes.

Results

In the four patients given the highest dose of acetazolamide (20 mg. per kg. body-weight) the C.S.F. pressure rose by 147–155 mm. C.S.F. above the initial mean level



Effect of intravenous acetazolamide on C.S.F. pressure in an epileptic patient (case 2).

(see table and figure). This response began within a minute after the end of the injection, reached its peak in 3 minutes, and gradually returned to the initial level by the 30th to the 40th minute. In only one case was there a later fall in pressure (30 mm.) below the basal level. No significant change in blood-pressure or respiratory rate was noted at any time. The smallest dose of acetazolamide (7 mg. per kg. body-weight) had no effect on the C.S.F. pressure in two patients, whereas the intermediate dose (14 mg. per kg.) caused a small rise (78 mm.) in one patient. Five patients noticed no effect from the drug, one complained of headache, and another of drowsiness. One patient, who was observed to have transient lapses of consciousness at approximately 2-minute intervals during the initial period of observation, had no further lapses for at least 1¾ hours after the injection of the highest dose of acetazolamide.

Discussion

The immediate increase in C.S.F. pressure in the four patients given the largest dose of acetazolamide is in accord with the findings of Knopp et al. (1957). These workers administered acetazolamide intravenously to anæsthetised animals and observed a fourfold increase of pressure in normal monkeys, and a much greater rise of pressure in monkeys with an experimentally raised C.S.F. pressure. We encountered no consistent decrease in C.S.F. pressure, such as was found by Tschirgi et al. (1954) in animals artificially respired after being paralysed with curare. Knopp et al. used acetazolamide in doses of 150 mg. per kg. body-weight, but in our patients as moderate an amount as 14 mg. per kg. produced a substantial increase in C.S.F. pressure. Acetazolamide should therefore not be given (at least parenterally) to patients suspected of having raised intracranial pressure. Nothing is yet known about the effect, on the C.S.F. pressure in man, of acetazolamide by mouth.

There are two ways in which the pressure may be raised: acetazolamide may either lead to increased C.S.F. formation, or it may cause intracranial vasodilatation. Knopp et al. suggested that the latter mechanism was the likely one and was brought about by an increase in plasma-carbon-dioxide. Maren (1956) has indeed shown that the plasma-carbon-dioxide rises, in spite of the metabolic acidosis induced by acetazolamide, because of interference with pulmonary excretion of carbon dioxide from the blood. Strangely enough, this did not result in much alteration of respiration in dogs treated with the drug, though normally the respiratory centre is very sensitive to even small fluctuations in plasma-carbon-dioxide. Thus, the absence of any change of the respiratory rate in our patients does not mean that the plasma-carbon-dioxide did not rise.

Summary

The carbonic-anhydrase inhibitor acetazolamide (' Diamox ') was administered to seven conscious epileptic patients with initially normal C.S.F. pressures. Intravenous doses of 14 mg. or more per kg. body-weight produced a significant rise in C.S.F. pressure which might be undesirable in patients with raised intracranial pressure. The mechanism of this response was not investigated.

We wish to thank Dr. E. A. Carmichael for his advice and for facilities; and Mr. J. R. Wilson, F.R.C.S., of Lederle Laboratories, for providing us with the ' Diamox ' used.

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New Inventions

ADAPTER AND MOBILE TUBE-SPATULA FOR USE WITH THE FRAME OF THE BOYLE-DAVIS GAG

THE adapter (fig. 1, A) slides vertically in the frame, and at the lower end of the adapter there is a horizontal slot which carries a flattened tube-spatula (B). The tube-spatula moves horizontally in the slot, and as a result this modified Boyle-Davis gag with one blade can be

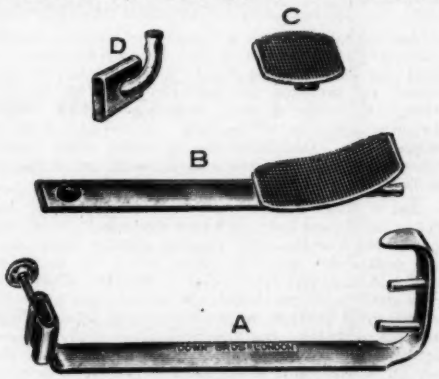

Fig. 1.

used for a patient of any size, from a small child to a big adult. The mobile blade does not interfere with the manipulation necessary for adenoidectomy.

The cap adapter (D) is used as a connection between the anæsthetic delivery tube and the tube-spatula. At the distal part of the spatula a short steel tube projects,

Fig. 2.

to which a short intratracheal tube can be attached if it is desired to employ intratracheal anæsthesia.

C is a small flattened piece which slides on to the tube-spatula, and may be found useful to widen the spatula for outsize adults.

The upper end of the adapter is projected forwards, and is capable of being placed in several positions when suspended, thus giving varying degrees of tilt to the tube-spatula. The instrument can be suspended by such instruments as the Draffin bipods, or the triangle with ratchet-suspension mechanism.[1] The instrument is shown assembled in fig. 2.

I wish to thank Mr. Maurice Down, of Down Bros. and Mayer & Phelps Ltd., for his help in making the instrument.

W. H. B. MAGAURAN
London, W.1 M.D. M.CH. N.U.I., F.R.C.S.

1. Magauran, W. H. B. *Lancet*, 1957, i, 771.

Reviews of Books

Principles of Epidemiology

IAN TAYLOR, M.D., M.R.C.P., principal medical officer (epidemiology), London County Council; JOHN KNOWELDEN, M.D., lecturer, department of medical statistics and epidemiology, London School of Hygiene and Tropical Medicine, and member of the statistical research unit, Medical Research Council. London: J. & A. Churchill. 1957. Pp. 300. 30*s*.

THE concise text on the principles of modern epidemiology which Dr. Taylor and Dr. Knowelden have now provided has long been wanted. Wisely, they have not attempted to produce an encyclopædia of the mass behaviour of every disease, nor have they achieved brevity simply by generalisation. From the start they emphasise the statistical background and rigorous scientific discipline which characterise modern work on the behaviour of disease in communities.

The use of vital statistics in the description of disease patterns is lucidly set out; and they draw freely from experience in the Medical Research Council units in backward and forward controlled inquiries, field trials of prophylactic methods, and sampling surveys of morbidity. Textbooks of bacteriological technique seldom give the student much notion of the ecological outlook on the precarious balance between man and his parasites; but this book successfully bridges the gap between routes of infection and the practice of disease control. Of special value to the student is the simple straightforward account of the general factors in host and environment which determine the incidence and severity of infectious illness.

Although the authors admit sympathy with the modern fashion of including the non-parasitic diseases in the field of epidemiology, the balance of space lies heavily with infectious illness. Since the book was clearly not written as a missionary text designed to convert the unbeliever, this emphasis on the basic training-ground afforded by the epidemiology of the infectious diseases need evoke no protest. Written by competent professionals for the embryonic specialist, it will rate as a "must" for all who need a firm grasp of this subject of increasing importance.

Cirrhosis und Narbenleber

Entstehung, Klinik und Therapie. Prof. Dr. med. HEINZ KALK. Stuttgart: Enke. 1957. Pp. 162. DM. 22.

THE introduction to this treatise on cirrhosis and post-necrotic scarring of the liver discusses the advantages of a "target needle biopsy," and the book is based on a large series of these examinations. This technique—practically unknown in this country—is a combination of peritoneoscopy and aspiration biopsy, which is said to be harmless and more informative than a blind needle biopsy.

The anatomy and physiology of the liver are briefly dealt with on classical lines, but the recent work of Elias is not mentioned. The differentiation of cirrhosis and post-necrotic scarring follows the lines suggested by Himsworth. The various forms of cirrhosis and the combination of cirrhosis with post-necrotic scarring are well described, but neonatal hepatitis, pericholangitic biliary cirrhosis resulting from cytomegalic inclusion disease, and Smetana's work on giant-cell transformation of liver parenchyma are omitted.

Some dogmatic statements could be criticised, such as "the transport of neutral fats from the liver can take place only after hydrolysis and phosphorylisation" (Frazer's work is not mentioned). Controversial claims, such as that of Baumgärtel that urobilinogen IXα and stercobilinogen have different sites of origin, are presented as facts. Gaps are unavoidable in a book of this size, but Sheldon's monograph on hæmochromatosis, Sherlock's work on blood-ammonia levels, and Dent's "overflow aminoaciduria" should have been mentioned in a book with 380 references.

The Shoulder

JAMES CYRIAX, M.D., M.R.C.P., physician to the department of physical medicine, St. Thomas's Hospital, London. London: Cassell. Pp. 40. 5*s*.

PAIN in or about the shoulder is very common, and an accurate diagnosis can often be made after a careful clinical examination, radiographs seldom giving further help. Dr. Cyriax here suggests the form such an examination may take, and he shows that, once the diagnosis is made, most patients can be relieved by simple methods (such as hydrocortisone injections) that can be applied by any doctor. General practitioners who wish to treat painful shoulders themselves will find Dr. Cyriax an interesting and helpful guide; and he makes several points that will be of value to many orthopædic specialists.

The Medical Interview

AINSLIE MEARES, M.B., B.AGR.SC., D.P.M. Springfield, Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1957. Pp. 117. 25*s*.

BASED, it seems, on experience of practice in Australia, this book sets out to determine what does and what should go on in the minds of doctor and patient at "interviews which do not concern organic disease, neither are they psychiatric interviews in any real sense". It could be objected that no-one can do more than guess at such things, the evidence for them being largely subjective and the observer being himself deeply involved; but Dr. Meares' guesses ring true and, when they concern the doctor, often strike shrewdly home. He attempts, systematically and honestly, to explore a field clearly worth exploring.

The book's usefulness and persuasiveness would be much increased by even a few illustrative cases with dialogue; whether real or suppositious would not greatly matter, so long as the dialogue had verisimilitude and the situations corresponded with reality. As it stands the book deals largely with abstractions, and without a vivid imagination or much well-remembered experience it is not easy to bring them to earth.

Dr. Meares comes near to making the dangerous suggestion that, were it not for its therapeutic uses, physical examination could be dispensed with at interviews of this kind "when we ourselves are perfectly sure that there is no disease present." It is surely much wiser not to be "perfectly sure".

Morbidity and Mortality in the First Year of Life

FRED GRUNDY, M.D., M.R.C.P.; E. LEWIS-FANING, D.SC., PH.D. London: The Eugenics Society (69, Eccleston Square, S.W.1). 1957. Pp. 145. 18*s*.

THE large sociomedical inquiry is now established as an important tool in the investigation of disease. Not only is the one described here excellent in concept and execution but also its results and conclusions have been presented with precision and clarity. No student of medicine can fail to be stimulated by this book; from it he will learn a great deal about this new approach to the study of illness, and he will also feel that he is at all times dealing with common but important problems. The questions awaiting answer concerning acute respiratory illness, immaturity, and congenital malformations are clearly stated, and it is in this sign-posting of the way to future progress that this sort of investigation is most fruitful.

Combined Textbook of Obstetrics and Gynæcology (6th ed. Edinburgh: E. & S. Livingstone. 1957. Pp. 936. 95*s*.).—The new edition of this widely known book is again the work of a number of authors, under the editorship of Prof. Dugald Baird. Much new material has been included, though the size has been reduced. The contributions, which are almost without exception models of simplicity and easy reading, have been blended into a harmonious account that can hardly fail to stimulate further any student or doctor with an interest in obstetrics and gynæcology. Profuse illustrations greatly assist the understanding of the normal processes and of the common abnormalities. A particularly good section is that on shoulder dystocia. At times (in the passages on manual dilatation and incision of the cervix, for example) the book goes into more detail than is required by students or general practitioners without being full enough for those more closely engaged in obstetrics. But this detracts little from the book's general excellence.

The Biology of Ageing (Symposium no. 6. London: Institute of Biology. 1957. Pp. 122. 25*s*.).—A year ago, at University College, London, ageing of cells, of organisms, and of populations was discussed by biologists from many different laboratories. The proceedings are now edited by Mr. W. B. Yapp and Dr. G. H. Bourne.

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THE LANCET

LONDON: SATURDAY, NOVEMBER 9, 1957

Penicillin Hypersensitivity

UNTOWARD reactions to penicillin [1 2] are now probably the commonest form of drug hypersensitivity. FEINBERG and FEINBERG [3] estimate that such reactions develop in 1–5% of patients treated with the drug.

Hypersensitivity reactions to penicillin may be immediate or delayed. The delayed reactions, which appear from 24 hours to 4 weeks after administration of the drug, are varied but usually take the form of serum-sickness. The manifestations include pruritus and urticaria, arthralgia, fever, albuminuria, and eosinophilia; more severe but much less common are exfoliative dermatitis and polyarteritis nodosa.[4] These delayed reactions, though they rarely result in death, may be more disabling than the condition on account of which the penicillin was given. The immediate reactions, on the other hand, take the form of acute anaphylaxis which may be rapidly fatal. It has been estimated [3] that there have been more than a thousand such deaths in the United States alone.

In the overwhelming majority of patients who suffer any type of penicillin reaction there is a history of previous administration of the drug, which has acted as the sensitising exposure. If the drug were given only on adequate indication, patients would not be needlessly sensitised, and reactions in those already sensitive would be avoided. Parenteral administration, especially of a depot penicillin, is more likely to cause sensitivity than is oral administration, but it is well to remember that penicillin creams or lozenges may act as sensitisers. Any penicillin preparation and any mode of administration can precipitate a reaction in a sensitised person.

When penicillin is to be administered, the risk of a reaction can be avoided only by prior detection of hypersensitivity to the drug. If the patient has previously received penicillin he should be asked about any reactions, no matter how slight, that may have resulted. It is never wise to disregard a patient's statement that "penicillin does not agree with me". If the history is positive, penicillin is absolutely contraindicated even if skin-testing yields a negative result. In the sensitised the skin test may remain positive only for a few weeks,[5] but in some cases skin-testing provides the only evidence of hypersensitivity. A positive test should be taken as a definite warning that a reaction is likely to follow subsequent administration of the drug. Skin tests are especially useful for screening patients known to have allergic tendencies TUFT et al.[6] list eight skin-testing techniques, and conclude that the most satisfactory is the intradermal injection of 0·02 ml. of a solution containing 10,000 units of penicillin per ml. This test may be preceded by a scratch test if extreme sensitivity is suspected.[5] By either method a control test with the penicillin diluent or vehicle should always be done at the same time, to exclude a false-positive result. An immediate positive reaction to a scratch or intradermal test, resulting in erythema and weal formation in 20 minutes, indicates a dangerous degree of penicillin hypersensitivity and the likelihood that a penicillin injection will be followed by acute anaphylaxis. Some [4] hold that the test site should be examined after 24–48 hours for a delayed positive result, which indicates the probability of a less severe reaction to administration of penicillin; but others [3 6] believe that this observation is unreliable. SMITH [7] has described a simpler test to detect liability to acute anaphylaxis. It consists in the application of drops of full strength (300,000 units per ml.) procaine penicillin solution, from the syringe prepared for the administration of the drug intramuscularly, to a skin scratch and into the conjunctival sac. The test areas are observed after 15 minutes; if there is no reaction the syringe, which has meanwhile been set aside, is used to give the injection. This simple procedure, which was applied routinely to all patients due to receive penicillin, is claimed to identify accurately persons liable to have penicillin anaphylactic reactions.

The treatment of acute anaphylaxis consists in intramuscular injection of adrenaline and, if necessary, intravenous administration of aminophylline. (It would be wise to have these drugs at hand whenever penicillin is being administered.) In this emergency it is essential to maintain an unobstructed airway, and, if respiratory distress is acute, to give oxygen and respiratory-centre stimulants; in extreme cases artificial respiration is indicated. Delayed reactions to penicillin are usually treated with anti-histamines, and, if the response is poor, corticotrophin or cortisone as well. In a novel but rational approach, MINNO and DAVIS [8] have treated these reactions with intramuscular penicillinase, which they believe is of therapeutic value, though they admit that its efficacy is hard to assess.

International Meetings

SINCE 1945 international meetings devoted to professional or scientific objects have been all the go. They have ranged from congresses of several thousand to committees of half a dozen. For many of us attendance at some of these has been a profitable pleasure: for some it has become an ineradicable habit. Some of these meetings have been impressive, some have been fruitful—and some might have been better. By now a pool of experience in organising such gatherings has accumulated, and it was a wise decision of the Council for International Organisations of Medical Sciences (C.I.O.M.S.) to publish a small book about it.[9] Its authors are anonymous, but every page shows the hands of those who have learnt that success is won not by airy good intentions but by foresight and hard—very hard—work.

The problems of any meeting, local or international, are two: first, to gather the participants and keep them together until the business is done; and, secondly, to diffuse knowledge, experience, or ideas. The two are interdependent, but organisers will do

1. See *Lancet*, 1953, ii, 75.
2. *ibid.* 1954, i, 31.
3. Feinberg, S. M., Feinberg, A. R. *J. Amer. med. Ass.* 1956, **160**, 778.
4. Kern, R. A., Wimberley, N. A., Jr. *Amer. J. med. Sci.* 1953, **226**, 357.
5. Berger, A. J., Eisen, B. *J. Amer. med. Ass.* 1955, **159**, 191.
6. Tuft, L., Gregory, D. C., Gregory, J. *Amer. J. med. Sci.* 1955, **230**, 370.
7. Smith, V. M. *New Engl. J. Med.* 1957, **257**, 447.
8. Minno, A. M., Davis, G. M. *J. Amer. med. Ass.* 1957, **165**, 222.
9. The Planning of International Meetings. Council for International Organisation of Medical Sciences. Oxford: Blackwell Scientific Publications, 1957. Pp. 113.

well to keep them apart during their preparations. The first involves a good deal more than the study of time-tables and hotel bookings. Who attends and what part he plays is a vital question for the convener of a small committee, but who shall be chairmen and principal speakers is of equal importance to the success of the largest congress. Most people like to rub shoulders with the great, but the greatest are not always those best qualified to lead a balanced discussion or even to prevent general embarrassment arising from personal differences or chauvinistic antagonism. Ambition may lead the organisers to announce a bumper programme on an overstretched timetable. We all know the result, and it is a comment characteristic of the entirely practical C.I.O.M.S. book that to empty a large theatre, allow its inmates to drink a cup of coffee, and get them to their places again never takes less than half an hour.

As regards the communication of ideas, the problems of a small body differ from those of a large congress not only in their size but in their nature. A committee has a specific task which its members are (or should be) anxious to complete. The members of a discussion group are selected or select themselves because they wish to exchange knowledge or experience with others of similar interests. The C.I.O.M.S. book points out that such intimate meetings may be divided into (1) a phase of exploration, when each member is finding out about his fellows ; (2) a phase when each is trying to establish his personal role in the discussion ; and (3) if all goes well, a final phase of cooperation marked by that feeling of oneness which leads to useful results. The large congress is quite another kettle of fish. Because the motives which bring its members together are various and seldom unmixed, no programme and no means of communication will be popular with everyone. Mental uplift, personal prestige, and merrymaking in a foreign climate are all magnets which draw the participants. Few attend large international congresses with the serious hope of acquiring new knowledge, and those that do so are probably disappointed. The difficulties are not so much intellectual as physical, and depend upon the size of the assembly halls, the need for simultaneous meetings of different sections, the limits of human endurance, and the curse of Babel. The good interpreter is a rare bird—there are said to be 120 in Europe—and the one who can interpret a technical discussion should be valued as the great auk or the dodo. The C.I.O.M.S. book discusses the technique of interpretation at length without much hope that the perfect answer will be found. But its severest warning is against the *soi-disant* bilingualist who dispenses with the interpreter : he is to be ranked with the person who arrives with a typewritten point of discussion in his pocket, to be delivered willy-nilly whether relevant or not.

It is easy to make a case against this rage for international congregation : how much can be learnt by rubbing elbows which cannot be found in the printed word ? Yet a committee set up to correlate international efforts in, say, tracing the spread of influenza can do more round a table in one afternoon than could be done in a month of letter-writing. He who learns more and more about less and less will find after a time that those who alone share his specialised experience are not in the next street or the next town but in Seattle, Lahore, and Freiburg i/B. He will correspond with them ; he will exchange ideas and material ; he may even come to think of some of them as " real " people ; but within certain limits of intellectual intimacy there is no substitute for a meeting in the flesh. The larger the conference the better target it is for the critics. One savant said that he attended only to learn whether X and Y were as big liars as he judged them to be from their published papers. Yet even the largest and most disorganised congress helps to evoke in many of those who attend some common loyalties to a common end, and in a divided world this must count for profit. The C.I.O.M.S. book admits all the failings of such meetings, including some we have not mentioned ; and it does not set out to justify them. Its purpose is simply to help those who have to organise them, and in this it will succeed very well. Indeed, it could be read with advantage by anyone who sets out to run a medical or scientific meeting of any size anywhere. It is really a masterpiece.

Hindquarter Amputation

HINDQUARTER amputation must remain for all time one of the most colossal mutilations practised on the human frame. So wrote GORDON-TAYLOR in 1935 [1]; and he has not yet been disproved, nor is he likely to be. The very name is an indication of the magnitude of the procedure, and, although it smacks of the butcher's shop, how much more descriptive it is than its mealy-mouthed synonyms. Interinnomino-abdominal amputation and interpelvi-abdominal amputation may sound more scientific, but surely they are no more accurate. Hemipelvectomy, a term now in use, is even less acceptable because it suggests that half the pelvis is removed without displacing the leg.

In the early days the removal of an entire limb was the prerogative of the surgical giants—BILLROTH, JABOULAY, GIRARD, KOCHER, and a few others of like stature—but even so the mortality was fantastic. KEEN and DA COSTA [2] found that of the 19 patients operated upon before 1903 nearly three-quarters succumbed. The operation remained one only for the very courageous, and there was little improvement in the results until 1915 when PRINGLE was successful with 2 consecutive cases. It was, however, the prowess of GORDON-TAYLOR that firmly established the operation as an orthodox surgical procedure. In 1935 he recorded the results of 5 operations with 3 survivals ; he persisted with increasing success until in 1952 he could report 64 amputations with a mortality of 22% (for the 53 patients operated on after 1940 it was 19%), and now he has himself performed the operation almost a hundred times. It is largely because of GORDON-TAYLOR'S teaching and example that hindquarter amputation is no longer the formidable undertaking it was, and now lies within the ability of any surgeon who has remained master of the anatomy of the abdomen as well as of the bones and muscles of the trunk. Technical ability, however, is no longer the sole criterion of success, and the steady reduction in mortality is less an indication of increasing surgical skill than a reflection of progress in the arts of anæsthesia and resuscitation. It is the anæsthetist and the clinical pathologist who are largely responsible for the improvement, and, although brilliant surgery reduces

1. Gordon-Taylor, G., Wiles, P. *Brit. J. Surg.* 1935, **22**, 44.
2. Keen, W. W., Da Costa, J. C. *Clin. int., Paris*, 1903, iv, 5, 13, 127.

the need for their aid, the best results are no longer possible without it. An outstanding example of the advantages of this teamwork has lately been given by LEWIS and BICKEL[3] from Rochester, Minnesota. Between 1943 and 1954 a total of 50 hindquarter amputations was performed by various surgeons of the Mayo Clinic without a single death—a remarkable achievement.

As an operation becomes safer and more widely performed, the indications for its use are often broadened—sometimes unwisely. In this case there is perhaps less risk of abuse than usual because of the daunting mutilation involved, but for this very reason caution must be redoubled. The disease for which hindquarter amputation is most commonly performed is chondrosarcoma, and it should be a matter for thought that this tumour is very often relatively benign. The problems that arise were very nicely put, albeit in rather a different context, some three hundred years ago by one of the greatest surgeons of all, AMBROISE PARÉ,[4] who wrote:

"It is not sufficient to know that amputation is necessary, but also you must learn in what place of the dead part it must be done, and herein the wisdom and judgment of the Chirurgeon is most apparent. Art bids us take hold of the quick, and to cut off the member in the sound flesh; but the same art wisheth us to preserve whole that which is sound as much as in us lies. I will shew thee by a familiar example how thou mayest carry thy self in these difficulties. Let us suppose, that the foot is mortified even to the ankle; here you must attentively mark in what place you must cut it off. For unless you take hold of the quick flesh in the amputation, or if you leave any putrefaction, you profit nothing by the amputation, for it will creep and spread over the rest of the body. It befits Physick, ordained for the preservation of Mankind, to defend from the iron or instrument and all manner of injury, that which enjoyeth life and health. Wherefore you shall cut off as little of that which is sound as you possibly can; yet so that you rather cut away that which is quick, than leave behind anything which is perished, according to the advice of Celcius. Yet oft-times the commodity of the action of the rest of the part, and as it were a certain ornament thereof, changes this counsel. For if you take these two things into your consideration they will induce you, in this propounded case and example, to cut off the leg some five fingers breadth under the knee. For the patient may more fitly use the rest of his leg and with less trouble, that is, he may the better go on a wooden leg; for otherwise, if according to the common Rules of Art, you cut it off close to that which is perished, the Patient will be forced with the trouble to use three legs instead of two."

The dilemma is twofold. Firstly and most important, the surgeon must take the greatest care to ensure that the whole of the diseased part is removed; and this, when treating malignant disease, can seldom be achieved by a limited resection. Some growths, however, are less virulent and then the tenets of sound surgery may be satisfied by a conservative excision. Such tumours are relatively common around the pelvis, and although the planning of an operation for local removal will tax the ingenuity of the surgeon, and its execution will demand skill of the highest order, it may well be feasible. The second requirement is to ensure that the healthy part that remains, perhaps the whole limb, will be of value to the patient, and that he is not condemned to carry around a useless member. If the tumour is excised, together with half the pelvis, will the remaining limb be an inconvenient third leg? Parts of the innominate bone have often been excised, but there is little modern experience to indicate how much of it can be removed without interfering too gravely with function. Reason suggests that, if the entire bone is excised, not only will the limb be unstable but also the muscles of the hip, deprived of their proximal anchor, will be unable to control the thigh. But is this so? The idea of hemipelvectomy occurred long ago to KOCHER,[5] and early in the century, discussing the indications for hindquarter amputation, he wrote: "We regard it, therefore, as the duty of the surgeon in every case to determine whether resection of one half of the pelvis with or without excision of the hip, will not answer the purpose. : . ." He performed the operation at least once and published a photograph of the patient after it.[6] On this occasion he resected the upper part of the femur and half the pelvis, saving only the pubic bone and its rami. There was four inches of shortening and about one inch of telescopic movement; nevertheless the man walked on his toes and began light agricultural work about three months after operation.

Certain tumours are perhaps as well treated by resection as by amputation, and the conservative operation, in skilled hands, may be no more dangerous. It is reasonable to expect that the remaining limb, with the aid of a modern weight-bearing calliper, will function at least as well as it did in KOCHER's patient. Is there a danger that the brilliant achievements made possible by the technical advance of our times may sometimes blind the surgeon to his fundamental duty to preserve those parts which are both healthy and valuable?

3. Lewis, R. C., Bickel, W. H. *J. Amer. med. Ass.* 1957, **165**, 8.
4. The Works of that famous Chirurgeon Ambrose Parey, Translated out of Latin, and compared with the French, by Th. Johnson. London, 1678.
5. Kocher, T. Textbook of Operative Surgery; p. 368. London, 1911.
6. *Ibid.* p. 308.

Annotations

A LEAD TOWARDS VIRUS CHEMOTHERAPY?

WORKERS with viruses are familiar with the fact that infection with one virus may interfere with the growth of another; the growth of a virus may be suppressed by the presence of the same virus which has been killed or damaged. Two recent papers, by Isaacs, Lindenmann, and Valentine,[7,8] throw light on this mechanism—light which may prove of more than academic interest.

These workers treated fragments of chick chorio-allantoic membrane with heat-killed influenza virus. Something capable of interfering with virus propagation was thereafter released from the cells. This something, which Isaacs et al. call "interferon," was set free from treated cells only after an incubation period, and it differed in several properties from the virus itself. It was not so readily thrown down in the centrifuge, but oddly enough was harder to filter. This anomaly could be explained if it had either a low specific gravity or a filamentous form. Unlike the virus, it did not agglutinate red blood-cells and was unaffected by specific influenza antisera. Moreover it was by no means specific in its effects, interfering with some related viruses and even with a wholly unrelated one—vaccinia. Evidence as to its chemical nature is at present sketchy.

Isaacs et al. suggest an intriguing possibility: the heated virus might get into the cell and start off a sort of imperfect virus synthesis leading to a "deadlock with

7. Isaacs, A., Lindenmann, J. *Proc. Roy. Soc.* B 1957, **147**, 258.
8. Isaacs, A., Lindenmann, J., Valentine, R.C. *ibid*, p. 268.

piling-up of distorted virus intermediates." What better could we ask for? This is just the sort of beneficial traffic-block we should like to encourage within cells, thwarting the virus' progress most effectively. Possibly the laboratory may one day produce interferons to combat virus infection, thus filling that awkward gap in chemotherapy.

A FIFTH MALARIA PARASITE OF MAN?

Plasmodium knowlesi is a malaria parasite which causes hæmoglobinuria and death in the monkeys of Malaya and the East Indies; it was first isolated in 1932 by Napier and Campbell [1] from a monkey said to have come from Singapore. The parasite is transmissible to man and has been used for malaria therapy in Rumania.[2] In Malaya *P. knowlesi* is probably transmitted by sylvatic mosquitoes, and human infections almost certainly occur. The erythrocytic forms of the parasite are not unlike those of *P. malariæ*, and mis-identification could easily arise in the routine examination of blood-films.

It was the discovery by Garnham [3 4] of the tissue-forms of *P.* (*Hepatocystes*) *kochi* in monkeys in Kenya that first directed attention to the liver cell as a site at which malaria parasites probably develop in man. Professor Garnham has since been associated with work which has led to the demonstration of a pre-erythrocytic cycle in the liver for *P. vivax*,[5] *P. falciparum*,[6] and *P. ovale* [7] in man, and *P. cynomolgi*,[8] *P. inui*,[9] and *P. knowlesi* [10] in monkeys.

Cyclical transmission of *P. knowlesi* in the laboratory has proved to be difficult. Sinton and Mulligan [11] made one successful transmission with *Anopheles maculipennis* in 1933. Jaswant Singh et al.[12] transmitted a non-virulent strain after much difficulty with *Anopheles stephensi* and *A. annularis*. It is now known that the gametocytes of some species of plasmodium lose their power to develop in the insect vector very rapidly if they are maintained by blood-passage in the mammalian host. When Hawking and his co-workers [13 14] used virulent, recently isolated strains of *P. knowlesi* they were more successful; oocysts developed to maturity on the mid-gut of *A. stephensi* and *A. maculipennis atroparvus*. The inoculation of mature sporozoites from the oocysts into monkeys produced blood infections, and it was evident that the pre-erythrocytic cycle of the parasite was very short. Sporozoites in the salivary glands of the mosquitoes were always scanty.

In order to have a reasonable chance of detecting pre-erythrocytic schizonts in the liver of the mammalian host it is essential to give a massive infection of sporozoites. Garnham et al.[10] found that, although *A. stephensi* was easy to maintain in the laboratory, infection with recently isolated *P. knowlesi* strains was not heavy, and that the small numbers of sporozoites which succeeded in reaching the salivary glands quickly died. *A. aztecus* from Mexico, which had already proved to be a good transmitter of *P. cynomolgi*, was a much more suitable vector than *A. stephensi* for *P. knowlesi*. The mosquito was very susceptible to infection, and large numbers of viable sporozoites reached the salivary glands. *A. aztecus* had the disadvantages of having a short life and of being difficult to maintain under laboratory conditions; large numbers of mosquitoes had to be infected to ensure that there were sufficient survivors to provide the necessary heavy inoculum of mature sporozoites. Garnham and his associates succeeded in finding pre-erythrocytic schizonts in the livers of inoculated monkeys, and they have now described the morphology of the parasite and its affinities with other species of plasmodia. The cycle in the liver cell is complete in $5^1/_2$ days. The erythrocytic cycle of *P. knowlesi* is also brief (24 hours), and Garnham makes the interesting suggestion that *P. falciparum* (with a similar $5^1/_2$-day cycle in the liver) may also have originally possessed a 24-hour blood cycle, which, by a sudden change, doubled its length. This hypothesis is supported by descriptions, from time to time, of strains of malignant tertian malaria parasite with remarkably short cycles in the blood.

The importance of *P. knowlesi* as a pathogen in man has yet to be investigated. Garnham writes: "When the Malayan jungles are freed of bandits, this question could be settled."

THE FRENCH DUCKS

AT the 9th International Congress of Cellular Biology, held at St. Andrews in September, Prof. J. Benoit and his colleagues [1] described the surprising results of their experiments in partially transforming Peking ducklings to khaki-Campbell ducks by injections of desoxyribose-nucleic acid (D.N.A.), the characteristic nucleic acid of cell nuclei. Their findings fall into two parts—the effect on the injected ducks themselves, and the effect on their offspring. The recipient ducks were 3 male and 9 female of the Peking strain, which were originally imported from China in the last century. This strain is heavy and has yellow feathers and orange-yellow beaks. The donor ducks were of the khaki-Campbell strain bred by Mrs. Campbell in 1901 from Rouen and Indian runner ducks. These are slightly built with dark beaks and brown feathers. Both strains probably originated from the wild mallard but are now very different. All the 12 Peking ducklings received five weekly injections of D.N.A. starting at the age of 8 days. The D.N.A. was obtained from blood-cells (erythrocytes are nucleated in birds) and testes of the khaki-Campbells. The 9 female ducklings received fourteen further weekly injections of D.N.A. from blood-cells only.

Atypical characters developed in 1 of the 3 male injected ducklings and in 8 of the 9 females. For example, the back part of the beak in the females became darkly pigmented, and the front of the beak became more or less rose-pink instead of orange-yellow. The feathers, instead of being yellow, were snow-white. The shape of the head and body also approximated to that of the khaki-Campbell rather than the Peking strain.

Even more remarkable was the apparent effect on the second generation. Of 26 ducklings born to the altered females (presumably fathered by the treated males) only 7 had yellow beaks, 5 had entirely rose-pink beaks, and 14 had beaks intermediate between pink and yellow though at 2 months none showed dark pigmentation of the beaks. In addition, like the treated parents, they showed atypical head and body shape.

These reports have understandably aroused much interest. Genetic transformation of bacteria by D.N.A. has been known since Avery showed that this was the transforming principle for pneumococci; but nothing similar has been claimed for multicellular organisms.

1. Napier, L. E., Campbell, H. G. M. *Indian med. Gaz.* 1932, **67**, 246.
2. Ciuca et al. *Edit. Acad. Rep. Pop. Romine*, 1953.
3. Garnham, P. C. C. *Trans. R. Soc. trop. Med. Hyg.* 1947, **40**, 719.
4. Garnham, P. C. C. *ibid*, 1948, **41**, 603.
5. Shortt, H. E., Garnham, P. C. C., Covell, G., Shute, P. G. *Brit. med. J.* 1948, i, 547.
6. Shortt, H. E., Fairley, N. H., Covell, G., Shute, P. G., Garnham, P. C. C. *Trans. R. Soc. trop. Med. Hyg.* 1951, **44**, 405.
7. Garnham, P. C. C., Bray, R. S., Cooper, W., Lainson, R., Awad, F. I., Williamson, J. *ibid*, 1955, **49**, 158.
8. Shortt, H. E., Garnham, P. C. C., Malamos, B. *Brit. med. J.* 1948, i, 192.
9. Garnham, P. C. C. *Trans. R. Soc. trop. Med. Hyg.* 1951, **45**, 45.
10. Garnham, P. C. C. Lainson, R., Cooper, W. *ibid*, 1957, **51**, 384.
11. Sinton, J. A., Mulligan, H. W. *Rec. Malar. Surv. India*, 1933, **3**, 381.
12. Jaswant Singh, Ray, A. P., Mair, C. P. *Indian J. Malariol.* 1949, **3**, 145.
13. Hawking, F., Mellanby, H. *Trans. R. Soc. trop. Med. Hyg.* 1953, **47**, 438.
14. Hawking, F., Mellanby, H., Terry, R. J., Webber, W. A. F. *ibid*, 1957, **51**, 397.

1. Benoit, J., Leroy, P., Vendrely, R., Vendrely, C. *Pr. méd.* 1957, **65**, 1623.

The effects on the second generation would, if true, be an example of the inheritance of acquired characters, though of a special kind since the characters have been acquired by the use of genetic material. The findings suggest that the chromosomes, instead of forming exact replicas of themselves as they grow preparatory to dividing before cell division, are ready to assimilate foreign and slightly different forms of nucleic acid. Apart from their theoretical interest the findings suggest important long-term prospects of treating and even curing genetically determined abnormalities.

It should be noted, however, that Professor Benoit and his colleagues stressed that these were preliminary reports, and judgment must be suspended until more experiments have been made and the results confirmed in other laboratories. One obvious precaution is that the strain of Peking ducks used in the experiments should be inbred without treatment, to make sure that they do not contain recessive genes; for these might have some of the effects attributed to D.N.A. The effects of D.N.A. from blood-cells only should be studied, as testicular material might perhaps contain hormones affecting body shape and feather colour. The reverse experiment should be tried of injecting khaki-Campbell ducklings with D.N.A. from the Peking strain. In addition, it is important to trace what happens to D.N.A. injected intraperitoneally.

THE FLUORIDATION DEBATE IN NEW ZEALAND

ANOTHER thick volume has been added to the already considerable literature on fluoridation of water-supplies in the prophylaxis of dental caries. The latest contribution is the report [1] of a commission appointed by the New Zealand Government to consider whether fluoridation would be likely to help in combating dental decay, whether fluoridation would involve any danger to the general health of the public, whether the local authorities were the most suitable bodies to decide whether or not to initiate such schemes in each locality, and whether such schemes could be validly considered to infringe human rights or the liberty of the citizen.

The commission, composed of a judge, a biochemist, and a non-scientific layman, reviewed all the available evidence on the first two questions, and drew the well-nigh inevitable conclusion that bringing the concentration of fluoride in public water-supplies artificially to one part in a million would almost certainly reduce dental decay in the population enough to justify the cost of the measure, and that such a low concentration would be very unlikely to result in fluoride poisoning of anyone drinking the water.

In addition to examining the results of all surveys and experimental schemes of fluoridation in the United States and Canada, the commission held several public inquiries, at which objectors to fluoridation as a public-health measure were able to state their case fully. Similar objections were raised to those that were voiced here when it was proposed to initiate ten-year fluoridation experiments in various parts of this country. Apart from a supposed inherent danger to general health, probably the most important objection was that to tamper with the public water-supply would be tantamount to an infringement of the right of each citizen to pure water. The commission did not accept this view, on the ground that, though the right to unadulterated water was undeniable, public water was seldom piped in its natural condition but was treated in one way or another beforehand. As long as no individual was compelled to consume water containing any substance to which he objected, the treatment of supplies could not be held to infringe his rights in any way. Apparently this judgment was based on the view that few citizens of New Zealand would be without access to alternative sources of water from springs or wells if they objected to drinking public water.

The commission recommended that fluoridation schemes should be started with as little delay as possible, and it concluded that the local authorities should carry these out.

1. Report of the Commission of Inquiry on the Fluoridation of Public Water Supplies. Government printer, Wellington, New Zealand. 1957. Pp. 240. 8s.

WARTS AGAIN

WARTS, these "vile excrescences," continue to exasperate the busy doctor and to intrigue him into speculation in moments of detachment. Their transmissibility is beyond question, and a virus is probably the culprit. Further definition is thwarted by the germ's obstinate preference for human skin and its stout refusal of all substitutes.

Clinical studies [1 2] point to the existence of two breeds of wart virus, and it is claimed that there are genuine histological differences between the warts produced by them. Pullar and Cochrane [3] support this view, having studied independently the clinical aspect and histological character of 400 warts in 164 patients. In 20% of cases, eosinophilic intranuclear inclusions are found in the wart cells. These occur almost exclusively in what Pullar and Cochrane call "inclusion warts" which are either solitary or few, painful, and deep, with a domed surface and a hyperkeratotic collar. They are often palmar (plantar warts were excluded from this study) and are commoner in adults than children. They may seem to be septic, but no pus is found on curettage. In the commoner type of warts, which they call "hypertrophic," such inclusions are rarely found. Such warts are more superficial and vegetating, often multiple and painless, and arise mostly in children.

Inclusion bodies in warts have been described by many authors over the past half-century; but there is no common agreement on what is significant. Blank,[4] for example, ignores all but the basophilic obliteration of the finer structure of the epidermal nuclei, but this is present in only a proportion of warts of all kinds. Lyell and Miles [2] favour the eosinophilic body as the significant structure, while earlier observers were impressed by the intracytoplasmic structures which are so striking in many warts. The last word clearly remains to be said on the nature and specificity of these different structures, the correlation, if any, between them, and their relation to general histological pattern, clinical aspect, and site.

There is also room for further inoculation experiments in volunteers, in order to decide whether the described differences in clinical appearance and histological character are constant and (presumably) a specific effect of the different viruses and not determined by age or site. This has been tried, but only on a small scale and with equivocal results.

Pullar and Cochrane [3] also record their results in experiments using the chorioallantoic membrane of the developing hen's egg. This was separately inoculated with cell-free filtrates of warts and extracts of normal skin. In a third series, pieces of normal skin were "grafted" on to the egg-membrane and then inoculated with wart-filtrates. Although interesting changes were observed, no differences were seen between preparations using filtrates from the two types of wart, and no inclusion bodies were found in any; from which it may be inferred that neither type of wart was transmitted.

Epidermal cells cornify as they ascend the epidermis. Even if cornification is abnormal in wart-infested cells, the virus must be able to survive in dead epithelial squames—that is, in some sort of keratin. Is it not possible that the virus can not only survive in keratin but also

1. Strauss, M. J., Bunting, H., Melnick, J. L. *J. invest. Derm.* 1950, **15**, 433.
2. Lyell, A., Miles, J. A. R. *Brit. med. J.* 1951, i, 912.
3. Pullar, P., Cochrane, T. *Scot. med. J.* 1957, **2**, 189.
4. Blank, H., Buerk, M., Weidman, F. *J. invest. Derm.* 1951, **16**, 19.

grow in it? This thought is suggested by the occurrence of multiple warts at a distance from one another and their frequent occurrence on the pressure-bearing part of the sole. Though the sole is a likely area to be injured in daily life, it is also the most heavily protected against trauma by a massive horny layer. It seems improbable that every plantar wart arising in heavily cornified skin is the result of inoculation by a piercing injury of sufficient depth to reach the succulent layers of the epidermis. Does keratin offer a medium for growth of wart virus that might be exploited in the laboratory? Would modification of the keratin render it unpalatable to the virus? Could such modification be the ultimate physical explanation of the successful psychotherapy or "charming" of warts that have cheerfully survived onslaughts with fire and sword?

GASTRIC ACIDITY

TESTS of gastric function, apart from radiological examination, are used less commonly than they were, for, although they can answer certain definite questions, the information they yield does not often influence diagnosis, prognosis, or treatment.

The simplest way to exclude gastric anacidity is to examine the gastric contents after an appetising meal. Even in patients refractory to small doses of histamine this simple test often reveals the stomach's power to secrete acid.[1] If no acid is found in this way, the maximal histamine test[2] is the most reliable way of establishing gastric anacidity.

Originally the histamine test of gastric secretion was performed with small subcutaneous doses of histamine. In the past decade the amount of histamine given has been increased,[3] the route changed from subcutaneous to intravenous,[3 4] and the side-effects made more tolerable by the prior intramuscular [2] or simultaneous intravenous [5] administration of anti-histamines. There is now evidence that the response to large doses of histamine can be used to assess the maximal power of the stomach to secrete acid and that this is usually proportional to the number of parietal cells.[6]

Although the information obtained by the histamine test is valuable in research, since it can be given a tentative quantitative interpretation, until recently it did not appear to have any special value in diagnosis except in addisonian anæmia.[7] There is now a report of its use in the diagnosis of cancer of the stomach.[5]

The distinction between benign and malignant lesions of the stomach is based on well-known principles, some of which were put on a quantitative basis two decades ago.[8] It was suggested that when the lesion was found radiologically to be larger than 4·5 cm. in diameter it should usually be regarded as malignant. When the lesion was smaller the acidity of the gastric contents one hour after taking a test-meal could in principle be of value in diagnosis. If the acidity lay between 0 and 20 mEq. per litre the possibilities of the lesion being malignant or simple were about equal; if the acidity lay between 20 and 40 the chances were 5 to 1 in favour of a simple lesion, and the odds rose to 14 to 1 if the acidity lay between 40 and 60 mEq. per litre. Furthermore, in an American centre the five-year survival of patients diagnosed as having cancer of the stomach was found to be greater the higher the gastric acidity. But these facts on acidity are rarely useful because most of the acidities for patients with gastric ulcer or gastric cancer fall in the lower ranges which are common to both groups; and most clinicians in this country would not now endorse the statement that ulcers in the body of the stomach more than 4·5 cm. across are always malignant.

Hirschowitz et al.[5] have applied the intravenous histamine test, with an intravenous anti-histamine, to 15 patients with gastric carcinoma and 16 patients with gastric ulcer.[5] In patients with gastric ulcer the concentrations of acid and chloride were always higher than 80 and 135 mEq. per litre respectively; but in patients with carcinoma of the stomach the values for acid and chloride were less than 80 and 135 mEq. per litre respectively. Thus in these small groups the results of the test gave an absolute discrimination between those patients with simple and those with malignant ulcers. Hirschowitz et al. themselves point out the smallness of their two groups and also remark that the patients with cancer had advanced disease. There is thus no evidence in their paper that the test does aid diagnosis. The underlying abnormality responsible for the low concentrations of acid and chloride in the patients with gastric cancer is likely to be of more interest to the clinical physiologist than to those looking after the patient.

Clinicians in this country have for some years been using the "maximum histamine test" with intramuscular injections of anti-histamine.[2 7] Card et al. found not a single instance of "anacidity" in 500 tests, except in patients with addisonian anæmia [7] and 1 patient with hypopituitarism.[9] The mean amount of acid secreted per hour by patients with gastric cancer was less than half the usual amount. Card believes that a value which is clearly higher than the mean for normal subjects—i.e., above 20 mEq. per hour—can be taken almost to exclude carcinoma.[9]

NOBEL PRIZE FOR CHEMISTRY

Sir Alexander Todd, who receives the Nobel prize for chemistry, has worked especially on the structure and synthesis of substances of biological significance. In the early 1930s he and Robinson accomplished the synthesis of the anthocyanin pigments of plants, and later, in Barger's laboratory, Todd made valuable observations on the structure of vitamin B_1, and particularly of the thiochrome that can be obtained from it by oxidation. He then turned his attention to the substances having vitamin-E activity (tocopherols), and from the Lister Institute published researches on the structure of these vitamins. More recently he has concerned himself with the structure of nucleic acids and related substances, and his synthetic flair has led to the development of methods resulting in the synthesis of adenosine triphosphate and adenosine diphosphate, which are of great importance in biological reactions. His work on the structures of nucleotides, nucleosides, and other substances related to the nucleic acids brings the synthesis of nucleic acids themselves within the bounds of possibility.

During the past few years Todd and his colleagues at Cambridge have been investigating also the structure of vitamin B_{12}, and, thanks to their close association with Dr. Dorothy Crowfoot Hodgkin's crystallographic studies at Oxford, structures for substances with this important vitamin activity have been provided. We may hope that, at 50, Sir Alexander has many fruitful years before him in synthetic organic chemistry.

Sir SIMON MARKS, a member of the court of patrons and a benefactor of the Royal College of Surgeons of England, has made a further contribution to the college funds so that work on the new buildings may be resumed. Details will be found on p. 956.

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The Wider World

THE NEW CHINA

Some Medical Impressions

T. F. FOX
M.A., M.D. Cantab, F.R.C.P.

As surgeon to a sailing-ship, my father took months to reach China; and Marco Polo took four years. By sea or afoot, Peking is still a very long way off, as Nature presumably intended. But by air the Temple of Heaven is now within a day's journey of St. Paul's. No longer does one need the eyes of a visionary to see the Chinese and ourselves as neighbours.

In August I was one of nine doctors who were caught up from their laboratories and wards and offices in London, Liverpool, and Cardiff, and deposited two days later beside the Empress's Summer Palace. We spent less than a month in China, and this article is based on no more than what we saw and what the Chinese said to us—reviewed in the light of my companions' comments,[1] some recollections of Soviet Russia,[2] and a little reading. If in places distance has lent disenchantment to the view, that is perhaps as well; for enthusiasm is infectious and Chinese persuasion has the art that conceals art. As a highly amateur photographer I have just learnt that the reason why some of my colour films have come out too red is that they were underexposed.

Though what we saw was mostly medical, and had little technical novelty useful to doctors in the West, it is worth describing if only because, in China as elsewhere, the state of medicine reflects and reveals the state of society. And this is a society undergoing, very rapidly, an astonishing change.

The East Goes West?

Much of what my father saw, and Marco Polo saw, is still as they saw it—the clear morning sunshine on the brilliant rice-fields, with a child supervising buffaloes; improbable mountains supported improbably by mist, as in the Chinese pictures; pagodas and palaces, temples and tombs; the craftsman on his doorstep or in some dark and decrepit workshop; the labourer, with strained face, half trotting under the loads suspended from a pole on his shoulder, or sweating as he heaves at a little cart piled high with rubble; the donkeys and mules, and little Mongolian horses; and the bustle of cities full of vigour and colour and children. But the buffaloes and the craftsman may now be working for a cooperative; the mountains have been surveyed for minerals, and the pagodas scheduled as ancient monuments; the rubble is going into a hydroelectric irrigation project; and even the donkeys figure in some official return. By courtesy of the People's Government, the Buddhist preacher—urbane and amused, like the president of an Oxford college, as he sits with vases of phlox and a cup of tea before him, and uses his fan to emphasise points in his sermon—by courtesy of the Government he may go on telling his irresponsive monks and his little congregation about the acquisition of merit by renunciation of self; but three miles away is an automobile factory nearly as big as Dagenham; and outside the temple and the tomb the people of China, yielding at last to Western influence, are putting their faith in materialism and science. The feet of these 600 million people have been set on the concrete path of hygiene and mechanisation that is to give us all long and happy lives in a utopia of nuclear physics.

The change was inevitable, sooner or later, no doubt. And if it has taken a form which some of us deplore we should remember that, for a century and more, the West forced its way into China and lost few chances of persuading the Chinese that good manners are no match for gunboats. Satisfied with its own rich civilisation, the Empire had wanted to be left alone. To George III in 1793 the Emperor wrote:

> "As your Ambassador can see for himself, we lack for nothing. I set no store by strange and ingenious objects and I have no use for the products manufactured in your country."[3]

Deliberately, the later rulers of China chose not to follow the example of Japan, which decided for the industrialism which made her a Great Power of Western type. But a collapsing dynasty could in the end do little to control the infiltration of British, French, Germans, Portuguese, and Japanese, who took advantage of imperial weakness to establish their own bridgeheads and spheres of influence, and impose their own conditions of commerce. As the Empire disintegrated under its independent warlords, Chinese defences weakened further; and, though the early government of the Kuomintang gave hope of national recovery, it was eventually broken by the Japanese conquest and occupation of vast tracts of China.

When Liberation came, in 1949, it was certainly not a liberation from Western ideas. The Communist liberators, disciplined by years of hardship, were revolutionary puritans passionately, and often nobly, resolved to create a new and better country, based on comradeship and free from privilege or graft. But for inspiration, example, and methods, they looked to a revolutionary Russia in which Western materialism was part of a new gospel. To many Chinese the Russian version of Western thought may indeed still seem more alien than the one previously brought to them from overseas.

Both, of course, have virtues as well as defects. If the record of the West in China was far from wholly good, it was not wholly bad; for exploitation was balanced, and perhaps outweighed, by missionary effort and by help arising from good will. Though we had sent warships and troops, we had also sent teachers and doctors and administrators, and a great many other people, of whom not a few worked for the Chinese with devotion and respect. One result was that many Chinese—indeed millions—had entered the Western Churches; another was that hospitals and medical schools of rising quality had been created; and a third was that a feeling of friendship for China had developed widely, especially perhaps in Britain and in America. The depth of that feeling—which still exists—was illustrated by the Rockefeller Foundation's decision to make the improvement of Chinese medical education one of its major interests, and by its expenditure of some 45 million dollars with that object.

When in 1949 the Communists assumed the task of reintegrating the disintegrated Chinese Empire, they were

1. The party consisted of two professors of tropical medicine (B. G. MAEGRAITH, dean of the Liverpool School of Tropical Medicine, and A. W. WOODRUFF, of the London School of Hygiene and Tropical Medicine); two professors of nutrition (B. S. PLATT, director of the Human Nutrition Research Unit of the Medical Research Council, and JOHN YUDKIN, of the Queen Elizabeth College, London); a professor of bacteriology (E. T. C. SPOONER, of the London School of Hygiene); a research-worker on industrial diseases (A. L. COCHRANE, of the Medical Research Council's Pneumoconiosis Research Unit); a general physician (F. AVERY JONES, director of the gastro-enterological unit at the Central Middlesex Hospital); a medical administrator (H. M. C. MACAULAY, of the North West Metropolitan hospital region); and a medical editor (T. F. FOX, of *The Lancet*). Professor Maegraith was our spokesman (in English) and Dr. CHANG WEI-HSUN, of the Children's Hospital, Peking, our bilingual link with some of his fellow-countrymen. We are much indebted to both of them.

2. Russia Revisited. *Lancet*, 1954, ii, 748, 803.

3. Quoted in Claude Roy's *Into China*, p. 153, (London, 1955). I cannot find the letter in Sir George Staunton's account of Macartney's *Embassy to China* (London, 1797), but this gives a fascinating description of 18th-century China.

introducing new forms of Western materialism and idealism—the Russian—to a country where a different kind of Western materialism was already established in the factories and a different kind of Western idealism in the universities and medical colleges. Moreover, the Russian pattern needed modification because it was being introduced into a country whose civilisation, with its complex customs and prejudices, had persisted for thousands of years with less change than any other.

Land of Compromise

Soviet Russia has a red flag with a hammer and sickle in one corner—emblem of the workers and the peasants. The equally red flag of People's China suggests a more realistic conception of the community. Partly encircling the single large star which represents the nation are four smaller ones representing its components—not only the peasants and the workers (the latter include salaried intellectuals) but also the petty bourgeoisie and the "national bourgeoisie" (a term covering industrialists and business men regarded as working in the national interest). Since the flag was designed, the independence of the capitalist groups has been weakened by the transformation of many factories and shops into "joint State-private enterprises", which means in effect that the State takes over the business but pays the owner perhaps 4% on his money and may retain him as manager at a salary. But this is fair enough, because the Communist Government never concealed its intention to work towards a Socialist society in which property and power would be vested in the People. It hoped that the able men in business or industry, seeing the benefits of Socialism, would in time become as much part of the People as are the factory-worker or the peasant; and meanwhile it allowed them to go on working as capitalists.

In the same way, the Communist Party did not in China abolish all the other political parties but has taken care to preserve those it regards as helpful in reconciling their members to Socialist progress. Even a few Cabinet posts are held by non-Communists, such as Madame Li,[4] the Minister of Public Health, who kindly received us in her home.

"Article 1 of the Constitution lays down that the People's Republic of China is a people's democratic state led by the working class and based on the worker-peasant alliance. At the same time, the Preamble clearly indicates that a broad people's democratic united front, led by the Communist Party and composed of all democratic classes, political parties, and people's organizations, will continue to play its full part in rallying the people for the fulfilment of the fundamental tasks of the state during the transition to socialism." [5]

Nobody can say what form of society will emerge in a country where Communist doctrine is exposed to a cultivated talent for compromise. Similarly one can do no more than guess at the future of medicine in a country where Soviet medicosocial organisation has been rather suddenly imposed on doctors whose training and medical thought were mainly derived from America and Britain. Moreover, in medicine as in politics, the two Western schools—Russian and Anglo-Saxon—have to be seen against the background of a native culture; for of some 430,000 doctors in China in 1955 no fewer than 360,000 were practitioners of the old traditional Chinese medicine which is without scientific basis.

The place assigned these traditional practitioners in the medical scheme is a further illustration of compromise.

TRADITIONAL MEDICINE

As China has only about 70,000 doctors trained in Western medicine, the care of most of her 600 million inhabitants remains in the hands of the traditional ones. A principle of the "patriotic health campaign", however, is that the two kinds of doctor must work together. To this end, the traditional practitioner is taught to undertake immunisation, and, in the cities at least, he is encouraged to recognise his limitations and refer for hospital diagnosis the case that may, for instance, be dysentery or smallpox or encephalitis.[6]

But cooperation is carried much further than that. Traditional doctors work side by side with Western doctors not only in the little surgeries of the farms but in the group practices or policlinics of the cities, and even in the largest hospitals, where they may be given wards of their own in which to practise acupuncture,[7] cupping, and Chinese orthopædics, or treat their patients with some of the hundreds of herbal and other drugs neatly arranged in their dispensaries. The patient may himself choose the traditional ward (one of our well-educated interpreters said that he would do so unless he had something seriously wrong); or the Western doctor, having reached a diagnosis, may think that the case will respond equally well or better to Eastern methods.

Particularly surprising to me was the place accorded traditional medicine in an up-to-date Shanghai hospital devoted entirely to schistosomiasis. The effects of various herbs were under study side by side with the effects of different courses of various antimony preparations; and a patient with gross ascites, for whom paracentesis was thought undesirable, was to be handed over to a traditional colleague for a course of purgative dehydration—after which he might be fit enough to return for his tartar emetic.

The more cynical among us could not but note the convenience of being able to refer one's less rewarding patients to an alternative system of medicine, which makes full use of the prescientific arts.

How much importance Chinese "modern" doctors really attach to traditional medicine is not quite clear. Cooperation has been ordained, and it is easily made to sound sensible. The head of a medical college declared that, since traditional doctors unquestionably cure patients, there must be something good in their methods. Accordingly their drugs are being studied by Western pharmacological techniques in orthodox laboratories as well as in the four colleges (with 500 students between them) which still teach traditional medicine. Fresh in our memories is the discovery of ephedrine in the Chinese plant *Ma-huang*, which is part of the traditional pharmacopœia; and they are now studying, among other remedies, liquorice (shown in the West to have a deoxycortone-like action), areca nut, gentian, and drugs believed to be anthelmintic and bacteriostatic.

Plausible though all this sounds, I fancy that the reason why Chinese medical students still have to spend so many precious hours in learning about traditional medicine is a patriotic or political reason rather than a scientific one. Remembering the retrogressive vogue of Nature therapy in Germany in the 1930s, one feels uneasy. But, as Cox has pointed out,[8] the Government's real views are shown by their giving comparatively few students a purely traditional training.

SURVIVAL OF THE FEE

Another compromise between things as they ought to be and things as they are is the decision—startling to British visitors—that the large majority of the Chinese people, poor though they be, must still pay for their

4. She is Li Teh-Chuan, widow of Feng Yu-Hsiang, known as "the Christian General".
5. Handbook on People's China; p. 48. Peking, 1957.
6. In Hong Kong, most of whose refugee population still rely on traditional medicine, many patients are sent to hospital only as a last resort, after weeks or months of ineffective treatment.
7. Pain and other symptoms are relieved by thrusting needles deeply into the tissue (see James, D. W. *Lancet*, 1955, i, 1068). A modern advance in technique is to send an electric current through the needles.
8. Cox, L. B. *Med. J. Aust.* 1957, ii, 554.

medical care. Even the hospitals are, in principle, self-supporting.

The doctors running a group practice in Peking charge 15 cents for a first attendance and 10 cents for later attendances. For a home visit their fee is 50 cents plus their fare if they go by pedicab instead of bicycle. In a Shanghai practice the first attendance costs 25 cents and a physical examination (for a certificate) 20 cents. With the exchange value of the yuan (Chinese dollar) at round about 3s., these seem small sums, and the fees at municipal clinics would be even less. But the cost of drugs and investigations can be serious. In the Peking group practice the average patient paid 1 dollar 10 cents for drugs (including immunisation), and in a municipal tuberculosis clinic the charge for a full-size X-ray film was 6 dollars (screening 40 cents). Entering a big Peking municipal hospital, the patient paid a dollar a day for board, plus 1 dollar 20 cents in a medical ward or 75 cents in an ophthalmic one. Expensive drugs must be paid for, and so must operations. The fee for a partial gastrectomy was 70 dollars—equivalent to the wages of a moderately skilled worker for a month or more.

Midwives in Peking charged 4 to 6 dollars for a delivery, including materials.

Asked whether his patients took their isoniazid and P.A.S., the doctor at the tuberculosis clinic said "Certainly; they've paid for it." And no doubt one could find some support in the Chinese profession for the view that all kinds of medicine lose value when given away. Nevertheless the official policy is clearly to extend free medical care—still regarded as a privilege—to more and more groups. At present it is given to Government employees and to students, and (through the trade unions) to industrial workers, whose families, too, are usually treated at half cost. Though these groups form a minority, even in the cities,[9] they will no doubt increase as industrialisation progresses.

Meanwhile, for the majority, the money barrier remains. Some patients who cannot afford to pay can get help from neighbours or other sources, and some may be excused payment if they bring a letter from their local street committee. But there must be vast numbers who cannot in any way raise the dollars required for an expensive investigation or treatment; and unless they can do so they will never get it. Regrettable though this is, the reason is plain. If all the ill people in China could demand, as a right, anything approaching modern medical care, the doctors would be utterly overwhelmed.

Even free care as we achieve it in Britain will remain impossible until far more doctors have been trained.

More Doctors

In China, as in Russia, the Communist policy was to produce more doctors very quickly. Before Liberation, medical training, except in certain Army schools, lasted at least six years; but the new Government reduced it to five years, and followed the Soviet plan by which some of the students, halfway through the course, begin to specialise in pædiatrics or public health. The medical colleges—which in China, as in Russia, are quite separate from the universities—were made to take more students than they would properly hold. The plan to raise their number from about 35 to over 80 had to be abandoned (partly through lack of teachers); but some of those already existing were enlarged. This year the pressure on them has been relieved by reducing the annual intake to 8500, which is not much more than half the previous figure; but they are still working under heavy strain. 11 of the colleges are administered directly by the Central Government, and 6 are very big indeed.

Peking Medical College, which had some 400 students before Liberation, now has more than 3000 (though a quarter of these are in the dental and pharmaceutical faculties). Shanghai No. 1 Medical College, from which 500 doctors had qualified in twenty-two years, now has 3200 students (including pharmacy). The four-year-old college at Canton has 2300. Though these schools have some fine new buildings, and are developing into great medical centres, or "medical universities", such as we could not hope to see in this country, present circumstances oblige them to provide instruction rather than education—to apply some of the techniques of mass-production. One must admire all the more, therefore, the efforts they are clearly making to preserve and improve their standards.

The sheer mechanics of dealing with an annual "class" of 400–600 are formidable. Some schools see no harm in lecturing to 200 at a time, provided the practical classes are small: others arrange for different lecturers to deliver the same lecture to small audiences. The Canton school is developing research and teaching units with a tutorial function, and this has already enabled small groups to undertake small research projects. It hopes in this way to solve the problem of producing a large number of students of a fairly high quality.

But five years (even if none of it were devoted to extraneous political instruction and foreign languages) is too short a time for converting a schoolboy into a reliable doctor who will go on educating himself—which has now become essential for efficient work as well as for teaching others. Lasting harm is done to a profession, and the people it serves, by introducing new members who have not had a proper basic training; so one can only hope that Chinese teachers will soon, as they expect, be given at least another year for their task. I have come to share Kilborn's [10] opinion that, though the emergency was great, the downgrading of educational standards was a mistake. Much useful medical work can be done by people without a good basic training, but they should not be called doctors. In China, I would say, entry to the overcrowded medical colleges should be further curtailed, and the need for more "pairs of hands" in medicine should be met by training more feldshers—assistant doctors on the Russian pattern, who take a three-year course after leaving school at 17.

The Student

I must admit that neither physical nor mental overcrowding seemed to be getting the students down. Living with four to six other people in a small room with bunk beds is not everybody's idea of university life; but, at the Peking Medical College for instance, the gay spirits and friendliness of the boys and girls [11] were irresistible.

Before coming to a medical college at about 19, they have had six years' primary and six years' secondary education, and have passed a State examination, lasting three days, including elementary science (biology, physics, chemistry) and Chinese literature and political science. Standards of secondary education are rising; but in China, as elsewhere, medical colleges do not find it easy to select the most suitable applicants. The Peking Medical College requires physical fitness, and looks for character (though "this cannot be done very well"): it wants the all-rounder, which in a Communist society may imply someone who has, among other things, got goodish marks for orthodox social activities. The students work hard and play hard, we were told in Canton; but, in Peking at

9. Patients treated in one year at a Shanghai hospital were classified as: Government employees, 8000; workers, 30,000; others, 250,000.

10. Kilborn, L. G. *Elixir, J. Hong Kong Univ. med. Soc.*, autumn, 1955.

11. To Western eyes, Chinese appearances are deceptive. Whereas in Britain girls f 15 often look as though they are 25, in China women of 25 look as though they are 15.

least, they are no longer encouraged to work during their two-month vacation. In Peking 44% were women, compared with 52% three years ago. Few seem to live at home ; and, though they are charged for their food, many do not pay the full rate and some pay nothing. If they need help, they tell their classmates, and the class or students' organisation applies to the authorities. There are no prizes.

In Peking, of 5000 curriculum-hours, 2400 are given to lectures (usually of forty-five minutes) and 270 to political studies.

For the first two and a half years, training is the same for internists, pædiatricians, and public-health doctors. Clinical subjects start in the sixth half-year, with some ward rounds. In Shanghai in the fourth year clinical students go in groups successively to different hospital departments, where they spend three hours daily as ward clerks or dressers, each with two or three patients whom they follow up. In the fifth (so-called intern) year eight to ten months are spent in hospital, with charge of 5–10 patients (seldom more) : in Shanghai at least, the intern does not have lectures. Pædiatric students go to children's hospitals, and public-health students go to epidemiological stations and factories in the cities.

The Canton college sends students for six or eight weeks to work in rural hospitals or public-health centres. This is thought good because (1) they get to know whether what they have learnt is useful, (2) they come back and ask questions, (3) as students they become more mature, and (4) they force their professors to orient teaching to the realities of the factory or the countryside.

As in Russia, examinations do not dominate the student's life. At the Peking college 80% were oral and 20% written : but oral examinations evidently take up a lot of the teachers' time, and opinions differ on what is ultimately best. There is inspection by the Ministry of Health but no external examiners. Three weeks are allowed for a final review, in which teachers help ; and at the viva the examiner hands the candidate questions on paper slips—2 or 3 out of a possible 200–300. In the class tests 5–10% fail and remain behind a year, but only 5% of students fail to qualify.

In the various medical colleges of the 1930s and earlier, teaching was usually in English but sometimes in other foreign languages, and the profession was disunited thereby. Since Liberation, teaching has been in Chinese, and foreign languages have had a setback. In the ordinary schools, because of Soviet help and the Korean war, Russian has taken precedence over English ; but the latter is likely to gain ground with its reintroduction into the secondary schools. At the Peking Medical College students were learning a little Latin (bottles in dispensaries bear Latin labels), and usually Russian or English.

The Graduate

Emerging from the educational tunnel, the student is now a doctor—internist, pædiatrician, or hygienist.[12] His future will largely depend on where he is sent ; and the heads of the medical college, receiving from the Ministry of Health a list of posts which they must fill, have to decide who goes where. So far as possible they consult the new doctor's wishes as well as his record ; but if he has unwillingly to leave his home for a little country hospital in some remote province—well, that is necessary to serve the People.

12. In Soviet Russia those selected for public health have often been discontented, wanting to be " real " doctors. In China, once selected, it is difficult to change, except that the internist may become a pædiatrician. But in Peking the feeling against a public-health career was said to be lessening. Early specialisation in pædiatrics was defended on the ground that emphasis is now on the younger generation, whose problems differ from those of adult medicine and surgery.

In Russia, where training has often been too short and superficial, a great deal is made of postgraduate education, and doctors are commonly brought back to the big centres to have their technique improved. In China postgraduate schemes are less ambitious, and little can yet be done for the rank and file. But the ordinary hospitals do serve to some extent as postgraduate centres for the local doctors, who can use their (surprisingly good) libraries and receive visits and talks from consultants ; and at a Government policlinic in Manchuria the doctors and nurses had a half-day off each week for study.

The Future Consultant

As in Russia, there are no general practitioners: "modern" doctors always work in groups, and they are all specialists (more or less) from the first. But more elaborate training is of course needed for those who are to be what we should call consultants, and this is given at the large hospitals. In Peking, before he is regarded as capable of hospital work as an assistant surgeon or physician, the young graduate must hold appropriate posts for four years—the course being a year shorter for ophthalmologists or pædiatricians. But for the scarcity of doctors, longer apprenticeship would be demanded. The pressure on residents, however, seemed to be less than it sometimes is in Britain. In a busy Shanghai hospital they were twelve hours on (eight hours with patients) and twelve hours off, though sometimes a resident would do a twenty-four-hour stretch. We were told that in that hospital the normal rate of working (presumably in the outpatient department) was 7 patients per hour.

The Future Teacher

Clever young graduates who are likely to be brought back into teaching or research will probably have to prove their mettle first in two or three years of clinical posts. After that, teachers from small colleges may go to large ones for a year. And for the fortunate few there is the chance of going to the Peking Union Medical College—formed by the Rockefeller Foundation in 1919 from previous colleges—which despite vicissitudes retains its position as the Johns Hopkins of China. Here the setting of high standards was formerly carried to almost extravagant lengths : I am told that after graduating in arts, qualification as a doctor took eight years and qualification as a nurse took five (which meant that too few nurses stayed the course). Though times have changed, and the international staff has long since gone, the P.U.M.C. retains much of its excellence, and could hold a key position in medical China. With the other big postgraduate college at Hankow (which we did not see), it has to teach the teachers.

The teaching there is at present on a smallish scale. Courses lasting two to four months are given from time to time in special subjects (e.g., medical entomology, histology, hæmatology). There are also refresher courses, chiefly clinical. But, from the standpoint of science, perhaps the P.U.M.C.'s chief service could be the training of the research fellows (38 at present) who come, at the expense of their own colleges, to work for a " candidate's " degree course.

Whether, in view of the training these young people have already had, it is really necessary that their course should be so much concerned with materialist dialectics and the history of the Revolution is no doubt a matter of opinion. So also is the question whether it includes too much theory and too little practice of research. The ultimate pattern, we were told, will emerge with experience ; and for my part, as one who is now eager to see Chinese medical science develop, I frankly hope that this pattern will prove to be rather more functional and rather less imitatively Russian than the present one.

The Research-worker

Besides the teachers in the medical colleges, who are encouraged to make time for investigation, China already has many doctors in research institutes. These seem able to get whatever equipment they need—usually from countries in the Communist bloc but sometimes from

Britain and (indirectly) from the United States. Some of the institutes are controlled directly by the Ministry of Health or the provincial governments, but we gathered that all will in due course be brought under the wing of the Academy of Medical Sciences, centred on Peking.

Nevertheless the academy is not the planning authority: its position is roughly that of our National Institute of Medical Research at Mill Hill, except that it is to be given clinical departments. The direction of medical research is in the hands of a Ministry of Health committee with some sixty members. And, though this Ministry committee corresponds in some respects to our Medical Research Council, it exercises much more comprehensive control. Because China has too few trained investigators they must all, it is felt, work to a plan in which first things are put first. The central committee forms this general plan, and then asks the institutes and colleges what they will contribute. According to their facilities, and the interests and capacities of their workers, the institutes and colleges make their own detailed plan, which if approved becomes the programme of the year.

Our discussion of this system at the Academy of Medical Sciences in Peking covered the same ground as a previous discussion at the Academy of Medical Sciences in Moscow[13]: we were assured that there is no contradiction between such planning and the pursuit of individual lines of investigation. Obviously the arguments for operational as opposed to academic research must carry great weight in a newly developing country where so many practical problems urgently need solution; but, though I was much impressed by the staff of the academy, I was not convinced there, any more than in Moscow, that the right environment for the really original thinker—the person who matters most in the long run—has yet developed. Even in the short run, I have little confidence in a plan for the academy which includes traditional medicine as one of the five subjects whose study is to have priority.

Medical research is itself planned in outline at a higher level by a Scientific Planning Committee; and the concepts which govern this central planning were interestingly stated last year by Kuo Mo-Jo, president of the Chinese Academy of Sciences.[14] He agreed that scientists have to be able to give full play to their initiative and creativeness and that the policy of "letting flowers of all kinds blossom and diverse schools of thought contend" is an excellent way of drawing the best from them. But, he said,

> "We do not stand for research for research's sake. Our clearly defined fundamental task is to build socialism. . . . So 'letting diverse schools of thought contend' means that we must not only contend but contend to advantage. . . . There will be competition between various branches of science, and the scholars will compete with each other to see who have done more, have done it the better, quicker and more economically. At the same time, we will criticize the harmful ideas which are opposed to socialist construction."

To those who look on science as primarily a way of pursuing truth, these words represent, however excusably, a lower ideal. And our Western belief in academic freedom finds no echo in Kuo Mo-Jo's concluding appeal, on behalf of scientists, to his political hearers—fellow deputies of the National People's Congress:

> "Give us constant guidance and advice and exercise supervision over our work so that the scientific research in our country will advance at a rate commensurate with the progress of our national effort in construction."

The Doctor's Life

Our Chinese colleagues are people with whom it is easy to make friends. The more we saw of them the more we felt akin. But it would be foolish to underestimate the differences in their life, after one of the great revolutions of history.

First there are the relatively superficial differences. Like other people in China, the doctor reckons on an eight-hour day, six days a week, and seldom takes more days off than the half-dozen decreed for everybody. A distinguished professor may earn 500 dollars (say £75) a month; and a younger physician told us that he and his wife, earning 550 dollars between them, managed to save 100 a month because, though they had two children, their rent, with heating, was only 20–30. But the doctor must usually be content with what we should think very modest quarters; and the income of the rank and file is said to be insufficient even for exchange of the mild hospitality so much needed to relieve the cultural deadness of life in the remote country or in a factory district in the North-East.

Against all this, "we are not so much concerned with money nowadays"; and there is exhilaration in living in a country with so many signs of progress—new hospitals, new factories, new power-stations, new bridges, new parks and gardens. "Life gets better day by day," said an elderly professor in the North. If it is true that the number of doctors leaving the country has lately risen, it is also true that the excitement of building a new future—the sense of hope not always found elsewhere—is bringing many "overseas" Chinese back to People's China. Comparatively few doctors, it is said, are members of the Communist Party; but the rather conspicuous collaboration of some of the seniors probably reflects genuine approval, by a large proportion of the profession, of the Party's great effort to prevent disease and improve medical care.

If the new system meant nothing worse than levelling of income and amenities we need not feel troubled about it. But it also goes more deeply into people's life and minds. For all their willingness to compromise, Chinese Communists believe that those who are not with them are against them; and in the process of "self-examination" which they have introduced for vocational and other groups they have a means of moral suasion which can prevail against all but the most resolutely unorthodox.

As a method of improving the performance of a group of students, or technicians, or doctors, a meeting of the group for free discussion and criticism may be very beneficial—though in this country many of us might be rendered less (rather than more) cooperative by colleagues who said what they really thought. But when such meetings are held under the guidance of a Party member, for the express purpose of examining the political opinions of the group, they can all too easily acquire the indecency that characterises a heresy hunt in whatever country this takes place.

I am, of course, in no position to judge how gravely the medical profession has been affected by the meetings for self-examination which were held almost incessantly for weeks during this summer; but at least one of the political posters that seemed to decorate nearly every hospital corridor was, we discovered, a denunciation of a doctor on the staff. Such a denunciation could be merely childish—or it could be deadly.

I should like to think that I am taking too seriously the part which politics is made to play in the Chinese doctor's life. Certainly all that any of them would say to us against the perpetual meetings was that they took up a lot of time that might have been spent on research. But it would be wrong not to point out that the revolutionary regime in China, though nowadays it seldom uses physical sanctions against its citizens, is still capable, as perhaps no other Government, of changing not only what people do but also what they think. This power, which can be used for good as well as for ill, is the chief reason for its remarkable achievements, in medicine as in so much else.

(to be continued)

13. *Lancet*, 1954, ii, 806.
14. New China Advances to Socialism, p. 137. Peking, 1956. (Obtainable from Collet's Bookshop, 66, Charing Cross Road, London, W.C.2. 2s.)

Public Health

OVER THE HILLS FROM WINDSCALE

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THE time seems to have come for the reorientation of the public-health services towards the U.K. Atomic Energy Authority. The recent accidental overspill of radioactive atomic fission products on to the countryside around the Windscale plutonium factory raises questions which extend far beyond this particular incident. The answers may help the ordinary man to come to terms with the hazards that are the price for maintaining Britain in her place in the world of tomorrow.

The public-health authorities, so deeply absorbed in pursuing the minutiæ of their personal services, must now recognise that they have very serious responsibilities in the environmental field for safeguarding against the increasing risks of radioactivity. Because the production of radioactive material is now many thousand times greater than it was in the last decade, the public-health authorities cannot afford the complacency of leaving all control to the producers of fission energy and to the atomic physicists.

The problem is bedevilled by Security. It must be accepted that what goes on inside certain establishments may be secret, but when the effluvia from them scatter injurious substances over the surrounding countryside any consequent risks to human health are of serious public concern, especially to those people who live in the district and to the public-health authorities whose duty it is to protect them. Although the U.K. Atomic Energy Authority have taken upon themselves an overriding power to monitor and hide their own misfeasances, it would seem sensible for them to share as much of their moral burden with the local public-health authorities as may be consistent with declassifying security information. They have not done so at Windscale and Calder Hall.

Perhaps this reluctance was the basic cause of the grave disquiet of the people in Cumberland, Furness, and Westmorland following the Windscale accident. That disquiet was aggravated by a series of authoritative statements containing seeming inconsistencies, contradictions, half-truths, and irrational administrative expediences which could not be easily reconciled by native common sense. Further embarrassment was caused by the tripartite responsibilities of the U.K. Atomic Energy Authority for general radioactivity personal safeguards, the Ministry of Agriculture, Fisheries, and Food for milk and other foodstuffs being fit for human consumption, and the Ministry of Housing and Local Government for the safety of public water-supplies. That entailed a miniature Brains Trust assembling on the platform of public meetings, and the pronouncements were mostly equivocal. Although all those gentlemen did their best within the limits of their knowledge, and what they were officially allowed to say, it was difficult to overcome local distrust of the Man from the Ministry, and to mask an inevitable amount of buck-passing. Much public confidence was lost, mostly through ignorance of the facts and a knowledge of how to present them. It will take the combined good will of the public-health authorities and the U.K. Atomic Energy Authority to restore that confidence. The facts have to be faced, not in any spirit of recrimination, but to see what lessons can be learned for future accidents, and to secure a better liaison programme during the normal routine working of atomic plants wherever they may be.

The Accident

At the time of writing, the cause and full effects of the accident have not yet been disclosed, but it seems to have been the type of accident foreshadowed as long ago as 1954 in the Central Office of Information book *Britain's Atomic Factories* in so far as active fission products were blown out from the chimneys of the pile. That is the sole aspect of the accident which concerned the public-health authorities in the adjoining areas.

The wind and climatic conditions at the time were very material to the consequences. It was said at first that a north-east wind had blown the fission products safely out to sea, but that statement was locally believed to be either untrue or a half-truth. Within a short time the wind was certainly seen to be from the north-west, and the subsequent geographical pattern of the fall-out confirmed it so. There was also fairly heavy rain on the central and south-west Lakeland mountains early that evening, so it seems possible that there was an additional washout of the cooling airstream. Some of the airborne fission products were traced in London, and tellurium was detected in Denmark. The areas adjoining Windscale were naturally on the alert for untoward immediate consequences, and will remain so for any long-term effects.

Liaison with the public-health authorities was either long-delayed or non-existent. After the initial 20 hours' silence, statements issued by the A.E.A. were first directed to playing down any risks of damage, and emphasising that the radioactive iodine escaping through the chimney filters had a comfortingly short half-life. There was little mention of the possibility of long half-life fission products being liberated. Then the rising concentration of radioactive iodine in the local cows' milk caused the Ministry of Agriculture, Fisheries, and Food to stop its sale, and soon the area of the milk ban was extended to 200 square miles downwind of the factory. Some of the affected milk had already been distributed. The exercise of the overriding power of the Ministry of Agriculture to stop milk sales relieved the local public-health authorities of their necessity to do so under the normal legislation, the Milk and Dairies Regulations, and so transferred any burden of compensation from the local rates to the national exchequer.

It was very difficult to explain to farmers the administrative expediency of drawing a line on a map to differentiate those herds which were deemed, if not proven, to be yielding milk above the safety level of radioactivity, and even more so to justify the blacklisting of cows which had been fed indoors on concentrates and silage instead of grazing contaminated pastures. It was even more surprising that no standstill order was imposed to ban the movement of cattle out of the affected area. Cows were freely sold from the auction marts and were moved to various other parts of Britain. The follow-up of those exported animals to ban the sale of their milk caused much upset in their new homes, and, as it was obviously impracticable to provide the logical monitoring of their milk, the Ministry of Agriculture declared that those cows would be automatically deemed safe after 24 hours' grazing on clean land. That arbitrary decision implied that the easiest way to deactivate a cow was to move it out into another area, although taking it indoors to feed on clean winter fodder would not so qualify. The public-health authorities viewed such anomalies with misgiving, and it was not easy to calm the righteous indignation of the farmers affected.

It was reported that samples were taken of thyroid glands from animals in the local slaughterhouses, and that monitoring tests had been made of vegetable crops, eggs, and other farm produce, presumably by the Ministry of Agriculture. It was also reported that representatives of the Ministry of Housing and Local Government had tested all the public water-supplies. The local public-

health authorities who normally administer the relative provisions of the Food and Drugs Act, the Water Act, and the Public Health Act, watched those somewhat bizarre activities with a measure of relief at not having to compete with their own limited resources, and will await the findings with interest, if they are ever communicated.

Whether the results are too horrific, or security-classfied, or too inconclusive, was not disclosed, but the reticence did nothing to improve public relations in the affected area. Ignorance, fear, and rumour have long been formidable enemies of preventive medicine. The Windscale accident was no exception, and any plans for the future need to be framed with those principles in mind.

The Future

Those who live in the neighbourhood of atomic factories have long been fully aware from various Government publications that it was a safety policy to site the reactors well away from any large towns, on account of the danger of accidental escape of radioactive materials. The control of atomic fission products is admitted by the A.E.A. to be a new industrial technique, and the public-health authorities must therefore be on their guard.

The people in the area have to rely to a large extent upon the assurances of the A.E.A. If they are being called upon for sacrifice in the development of this new technology, they have to search their minds to assess the risks not only to themselves, but to the yet unborn generations of their families. It is not just a matter of risking thyroid damage, bone sarcomata, or leukæmia from ingested radioactive material of long half-life: it is the more responsible decision of risking increased gene mutations in their children and their grandchildren from total radiations. In the limited case of the southern half of Westmorland the incidence of congenital malformations is already high.

Westmorland lies very close to leeward of the prevailing westerly winds that sweep over the two 400-feet-high chimneys of the Windscale plutonium piles, and the two (soon to be four) reactors of Calder Hall atomic generating plants for electricity. The winds are pushed up by the nearby mountains and are rapidly cooled, and so the Lakeland valleys receive rainfalls between 80 and 120 inches per year. That heavy rain may be the first scouring in the air-conditioning of all but the larger particles escaping from the reactor filters. Temperature inversions may further complicate this effect.

The height of the chimneys, the prevalence of north-west and west winds, the general movement of air masses in low pressure systems, the precipitating effect of the mountains, and the air canalisation in valleys, raise doubts as to whether their chronic and cumulative effects may not be as important to public health in areas within some 25 miles downwind as they are in the immediate shadow of the reactors. The answers to such doubts may be resolved by better knowledge of the facts, if they can be disclosed. That is why the future is more important than the past incident at Windscale, for the same principles probably apply to most of the other atomic establishments in Britain and the countrysides surrounding them.

The public-health authorities must continue to look to the Medical Research Council, and any similar international bodies, for advice on the criteria for assessing maximum permissible exposures to radioactivity in the spheres of ordinary daily life. Any reduction in safety margins needs to be critically examined to see whether the underlying reasons for the change is advancement in knowledge or political and economic expediency. The internal safety discipline in A.E.A. establishments is a matter for that Authority; but the public-health authorities would be the happier for constant reassurance on the point, because it is clear that the effects of accidents cannot always be confined to the factories. Such aspects could well be taken in the stride of common-sense routine liaison between the A.E.A. and the local public-health authorities of a wider radius surrounding the factories. It may now be useful to outline what the scope of such liaison could be, taking Westmorland merely as an example to illustrate some of the points.

The first step is to secure disclosure of the baseline information as to what were the background radiation levels in a wide area around Windscale, before the A.E.A. commenced operations in their reactors. As the A.E.A. have been responsible for all monitoring, it seems reasonable to assume that they took the elementary step of establishing a datum line from which all future changes in radioactive fall-out could be measured. Such basic information can hardly be classified as secret.

The public-health authorities realise that any sampling points chosen by the A.E.A. may not have been sites which would have been selected by medical officers of health, but information about representative areas would be better than none at all. In Westmorland it would be desirable to relate the tests to the many upland gathering-grounds of public water-supplies, where there is much scouring of the land, scanty storage, and no purification treatment, where the water often contains contaminants in suspension as well as in solution. The aerial washings of Windscale can pass direct into human stomachs in a matter of hours.

Having thus established a datum line for the virgin state, the next step is to know what changes there have been since Windscale and Calder Hall reactors commenced operations. It would help a more intelligent appreciation to know the progressive annual changes, whether there were operational, seasonal, or climatic fluctuations, and the range of their magnitude. But we need to know more than just the gross quantitative data of mixed radiations in our local fall-outs. We need information on the qualitative aspects to differentiate between the radiations from radioactive material of short half-life, and the perhaps more serious fission products of long half-life, with even more knowledge of their biological half-life and particularly their propensities for concentration in target organs of the human body.

Assessment of any quantitative or qualitative changes from the datum lines in the background radioactivity over the past few years would seem to provide the minimum information which ought to be in the possession of any public-health authority which is not shirking its duty towards the people who live in the area. That at least would let everyone know where they stand today, and, in the case of north-west England, it would enable the Windscale accident to be brought into perspective against the background of previous routine operation.

If a liaison agreement can be reached between the public-health authorities and the A.E.A., future monitoring could include sites of public-health importance. It would seem preferable for the existing resources of specialised equipment and staff of the A.E.A. to undertake this monitoring programme, and be prepared to interpret and discuss the results with the medical officers of health of the county districts concerned. The medical officers of health would then undertake their normal task of translating scientific data to their councils and population in a manner and tongue long known to be acceptable to local idiosyncrasies. The alternatives are the setting up of an independent monitoring service by public-health authorities, or some contractual scientific organisation; but this would seem uneconomical and fraught with many practical difficulties, apart from any security aspects involved.

If some such general working agreement could be secured with the A.E.A. it might then be a relatively simple task for the public-health authorities to coordinate their local interests with the statutory functions in the atomic field of the two central Government departments

involved. The Ministry of Agriculture, Fisheries, and Food could exercise their control of radioactive milk, meat, and other foodstuffs in the cooperative way now obtaining for their non-atomic functions. The Ministry of Housing and Local Government could conduct their overriding supervision of radioactivity in public water-supplies in closer conjunction with the local medical officers' of health supervision of all other noxious contaminants. It seems curious that the Ministry of Health have been manœuvred out of any direct interest in this administrative complexity.

Better local public relations will depend on finding some remedy for the difficulties now stemming from the tripartite interests of the A.E.A. and two central Government departments, all three entirely divorced from the local county district medical officers of health and their public-health authorities The present machinery creaks in normal times, and breaks down in emergencies

It would be desirable to correlate the changes in the quantity and quality of background radioactivity with estimations of bone and other organ concentrations in human stillbirths, infant cadavers, slaughterhouse material, and local wild herbivorous and carnivorous fauna; to correlate the radioactivity with the heavy rainfall and other climatic factors; to have a clearer idea of criteria for milk and public water-supplies; to check the incidence of leukæmia and thyroid disease; to check the incidence of congenital malformations, other genetic mutations, stillbirths, and neonatal and infant deaths; and to keep in touch with any parallel veterinary investigations on animals. Those are some of the points which affect the everyday life of our people, and they can be covered only by the intelligent cooperation of the users of radioactivity with medical officers of health.

But public-health authorities are becoming more and more concerned about users of radioactive materials other than in A.E.A. establishments. The Radioactive Substances Act, 1948, has not been implemented, and at the present time the draft Factories (Ionising Radiations) Special Regulations promise little more than an attempt to introduce some degree of internal discipline into slap-happy factories. It seems curious that the appointed factory doctors, who are often local general practitioners, should be charged with these complex technical responsibilities, while the medical officers of health for the districts containing the factories are not even mentioned. Yet any radioactive material that comes out of such industrial premises is solely a public-health worry, and perhaps the medical officers of health cannot be entirely absolved from an interest in his people while they are at work. Britain seems to be sleeping-in on many of these problems: it is time we woke up.

Pessimistic although the thought may seem, there may be further major atomic accidents. Perhaps not the same as Windscale, but no doubt other forms of reactor moderators and coolants are liable to have their own specific variety of accident, to produce the same end-result of spraying excessive radioactivity over the surrounding countryside. The public-health authorities would be foolish to rest complacent with the soothsayers. Common prudence would suggest devising some warning system so that the local population could at least have the choice of sweeping themselves, and their children, and their livestock indoors before the shadow falls across them. Even the local air-raid sirens could suffice. After those emergency precautions, a prompt and intelligent use of the radio, television, and the responsible press, coupled with a close liaison with the local public-health authorities, could do more to preserve public confidence than silence or half-truths. Those basic principles could be applied to atomic factories and other users of radioactivity all over Britain. The British people are not frightened of reality, but they like to face it with the courage born of true knowledge and understanding.

Radioactive Strontium in Soil, Grass, Milk, and Bone

A report [1] from the Atomic Energy Authority's research group records the results of ^{90}Sr analysis of soil, grass, and sheep bone from twelve sampling stations in England and Wales in 1956; and it also gives the findings in 79 samples of human bone analysed between October, 1955, and June, 1957.

The analytical methods and counting techniques for ^{90}Sr are lengthy and complicated, so that relatively few samples could be analysed in a year; but it was decided to include a wide range of climate and soil conditions in the survey. The soil analyses showed fairly good agreement between the ^{90}Sr estimated to have come down in rain and the quantities actually found in the top 4 in. of soil—in other words, the wetter places had more ^{90}Sr in their soil. Thus, it seems that ^{90}Sr remains largely in the top soil for periods of the order of years.

The acid and very-low-calcium soils grew grass containing a lot of ^{90}Sr (up to 2100 $\mu\mu c$ per g. of Ca) (1 $\mu\mu c$ of ^{90}Sr per g. of Ca = 1 strontium unit); vegetation on the alkaline calcareous soils was low in strontium. But it was only when the soil contained less than 1 g. of calcium per kg. dry weight that the strontium content of grass was found to be increased. Only the samples from Cwmystwyth, Cardiganshire, and Rookhope, Durham, were as poor as that in calcium.

The bones of yearling sheep from seven of the sampling stations were analysed. Lowland sheep had an average of 14 strontium units (S.U.) in their bones; for hill sheep the content was 57 S.U. The report points out that the hills grazed by sheep in Britain are generally areas of high rainfall; the soil is uncultivated, peaty, and poor in calcium; and there is a poor yield of vegetation—any or all of which conditions may increase the uptake of ^{90}Sr. The relative importance of these factors is not yet clear, but variation in total fallout of ^{90}Sr is certainly not the only cause of the difference between the sheep; the bones of hill sheep contained more ^{90}Sr per unit fallout than those of lowland sheep.

Spray-dried skimmed milk from a factory at Frome, Somerset, was examined for ^{90}Sr activity. A comparison of milk activity with total fallout showed that, whereas fallout had increased fairly steadily for the past three years, milk activity rose quickly from about 2 to 5 S.U. in the spring of 1955 and had thereafter stayed roughly constant. The report adds that "the general trend is consistent with the theory that the milk activity is determined partly by the cumulative fallout and partly by the rate of fallout."

The specimens of human bone examined came mostly from South-East England and the Midlands; there were a few from the West and North-West and these included the two showing the highest ^{90}Sr activity (among bones examined up to the end of 1956)—namely, 1·55 S.U. in a two-year-old Plymouth child and 1·3 S.U. in a Carlisle child of three months. (Provisional figures obtained this year include 2·3 S.U. in a Cumberland child aged one year and 2·4 S.U. in a Liverpool child of six months.) The highest ^{90}Sr activity recorded in 1956 gives an average dose to bone which is a tenth of that due to natural radium, when allowance has been made for the relative biological efficiency of the X rays, and a thirtieth of the total natural dose from internal and external sources. The 1956 maximum of 1·55 S.U. is a sixtieth of the maximum level laid down as permissible for the general population and a sixth of the level above which, in the words of the Medical Research Council report, [2] "immediate consideration would be required." The 1957 maximum of 2.4 S.U. is just under a quarter of that level.

Influenza

The epidemic of influenza is waning; the number of deaths in the 160 great towns of England and Wales in the week ended Oct. 26 was 396 (600) from influenza, 505 (545) from pneumonia, and 478 (502) from bronchitis

1. Bryant, F. J., Chamberlain, A. C., Morgan, A., Spicer, G. S. Radiostrontium in Soil, Grass, Milk, and Bone in the United Kingdom. A.E.R.E. HP/R2353. H.M. Stationery Office. 5s.
2. See *Lancet*, 1956, i, 999.

(previous week's figures in parentheses). There are even signs of a decline in Southern England, as the following figures for deaths from influenza show :

Region	Week ended Oct. 12	Oct. 19	Oct. 26
Northern	43	36	11
East and West Ridings	50	40	16
North-Western	142	110	64
North Midland	53	46	23
Midland	113	109	68
Eastern	16	24	21
S.E. (including London)	119	164	150
Southern	16	28	28
South-Eastern	22	38	20
Wales	23	13	10

Deaths from pneumonia and bronchitis decreased in general less strikingly than deaths from influenza, and in some regions the numbers of deaths from pneumonia and bronchitis were still rising.

Dr. J. L. Burn, medical officer of health for Salford, estimates that there about two-thirds of the school-children, half the under-30s, and a third of the total population have had influenza. Many patients had a relapse a few days after the first attack ; often they felt worse after the relapse than after the initial attack. Early in the epidemic patients were absent from work or school for about ten days ; later, the average was nearer three weeks.

More Poliomyelitis Vaccine

THE Ministry of Health announces that the first poliomyelitis vaccine produced by a second British pharmaceutical firm has now passed all its safety tests. It is sufficient for about 117,000 doses. To prevent the vaccine being held up until enough is available for the next general distribution, it has been sent to a limited number of local health authorities in England. All the remaining authorities in England, as well as those in Scotland and Wales, can expect to receive their usual allocation shortly from vaccine supplied by the other firm. The chief medical officer of the Ministry of Health, Sir John Charles, has told medical officers of health by letter that the composition of the two home-produced vaccines is identical and that they can be used without distinction. This latest issue brings the total number of doses of vaccine distributed to local health authorities throughout Great Britain since May, 1956, to just over 3,400,000. It is hoped that, provided the stringent tests are satisfied, regular supplies of vaccine at intervals of four to six weeks will now be received from both British firms. As a result, considerably larger quantities of home-produced vaccine will be distributed to local health authorities from now onwards.

The second firm referred to in the Ministry statement is Burroughs Wellcome & Co. and the vaccine is prepared at the Wellcome Research Laboratories, Beckenham, Kent. All vaccine previously issued has been made by Glaxo Laboratories.

The Second Quarter in Scotland

IN the second quarter of this year in Scotland the infant-mortality rate was 27 per 1000 live births, a little higher than the rate for the second quarter last year but below the recent average. The stillbirth-rate was 24 per 1000 total births. The birth-rate was 19·5 per 1000 population (as in the corresponding quarter of 1956) and the death-rate 11·2 per 1000 (0·2 less than in 1956). The death-rates per 100,000 were 12 (13) from tuberculosis, 214 (209) from cancer, and 50 (51) from violence (figures in parentheses for corresponding quarter of last year). The maternal-mortality rate was less than half the average for the previous five years.

Medicine and the Law

The Function of a Medical Witness

A husband, who had left his wife in August, 1956, presented a petition for divorce in October, alleging cruelty which had affected his health. The wife denied the cruelty alleged. In February, 1957, the husband consulted a psychiatrist, who was the only medical witness called as to the husband's health at the hearing before Mr. Justice Wallington in May, 1957.

The Judge dismissed the husband's petition on the ground that he had not proved that his health had been affected. The Judge commented on the psychiatrist's evidence, that he had said that the husband was tense, distraught and anxious, that he had questioned him carefully about his mental health, and that he had concluded that the man had been suffering from a chronic anxiety state for a number of years. That, said the Judge, was a course which a doctor had no right to pursue for the purpose of giving evidence in any court. The effect of it was that the doctor made himself judge and examining magistrate, deciding outside the court matters which were exclusively for the court. That type of evidence, his Lordship said, ought never to be obtained for the purpose of litigation of this kind.

On Oct. 31 the Court of Appeal dismissed the husband's appeal against this judgment. In doing so Lord Justice HODSON said that the court could not overrule the Judge's decision that the husband had not made out his case. That really concluded the matter. But the case had an unusual feature. The husband had not called any medical evidence as to what took place during the married life ; but after he had presented his petition he had consulted an eminent doctor. That was very much an ad-hoc examination for the purpose of the case ; and the Judge had taken a severe view of it. The doctor's evidence in fact amounted to very little. He had examined the man once and found him in an anxiety state, had asked him a great many questions—as a doctor naturally would do—in order to form a conclusion as to his state of health, and from the answers given formed the view that the anxiety state had existed for a long time. Frankly relying on those answers, the doctor had expressed in his evidence his opinion that the man was suffering from a chronic anxiety state. The Judge's comment on that was not open to criticism, for what he said in effect was that the doctor could not prove the anxiety state since he only knew about it on the basis of what he had been told by his patient and had heard in court.

But in the earlier part of his judgment the Judge did seem to have thought that the doctor usurped the functions of the court by the way he had handled the matter. With all respect to the Judge, his Lordship did not think that the doctor was doing that. He was doing what every doctor did, namely, asking questions of his patient ; and it was only when he came to court that his mind was directed to the stories his patient had told him and which presumably the patient repeated in the witness-box. The Judge was the proper person to decide as to the truth of those stories ; but his Lordship did not think that this doctor had ever in any way asserted that he was a person who had any duty at all in the matter so far as these proceedings were concerned.

His Lordship did not, however, think that because the Judge had waxed somewhat indignant about the doctor's evidence it had in any way coloured his judgment against the petitioner. The Judge's view was that this medical evidence was and could be of only negligible assistance to him. Any indignation expressed must have been intended to be directed to the fact that it was really futile to call a doctor who had only seen this man for a short time after he had parted from his wife. The appeal should be dismissed.

Lord Justice MORRIS and Mr. Justice LLOYD-JACOB agreed.

BARKER *v.* BARKER. *Court of Appeal* : Hodson and Morris *L.JJ* ; Lloyd-Jacob *J.* Oct. 31, 1957. Counsel and solicitors.—G. D. Crispin (Gery & Brooks) ; J. G. Leach (Jas. H. Fellowes, Chingford).

M. M. HILL,
Barrister-at-Law.

Voluntary Mental Patients

Some confusion as to the law relating to the discharge of voluntary patients from mental hospitals may have been caused by the publicity given to the remarks of the Southwark coroner in a recent case.

The facts [1] were that a woman was admitted as a voluntary patient after a suicide attempt, but after five days she was released at her own request. The psychiatric registrar had talked to the patient and found her "very penitent." He did not consider that there was any need for certifying or detaining her. Six weeks later the woman and her 4-year-old daughter were found gassed.

At the inquest a verdict was returned that the woman had murdered the child and committed suicide whilst of unsound mind. The coroner stated that there had been a breach of the law in that (as he said) the patient should have been required to give 72 hours' notice of her intention to discharge herself from the hospital. "This is done to give the hospital a chance of getting a patient legally detained. Letting her go seems a very difficult action to condone."

The coroner subsequently admitted that this was an incorrect statement of the law[2].

The law relating to the admission and discharge of voluntary patients is to be found in sections 1–3 of the Mental Treatment Act, 1930, as amended by subsequent legislation. These sections do not contain any requirement that a voluntary patient must give notice of his intention to discharge himself, and it seems that neither the Minister nor the hospital can impose any such requirement.

Special Articles

FULMINATING INFLUENZA

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IN the present epidemic of influenza, most of the cases have been mild. Thus Lim et al. (1957) had no deaths in the 298 cases which they studied in Singapore. Deaths, of course, have occurred; but these have been scattered, so that there has been little opportunity to study a series of fatal cases. Guthrie et al. (1957) studied an outbreak of "Asian" influenza in Ahmadi, which affected 1429 people. Even there, however, there were only 2 deaths among the 350 patients admitted to hospital.

In six weeks from the middle of September, 1957, I examined 12 cases of fatal fulminating influenza. Mitral stenosis was present in 3 of the cases and might be regarded as a major factor in producing death. The remaining 9 patients were previously healthy, and 8 of them were young. Although many large series of cases of fatal influenza were studied in the 1918–20 epidemic, it seems worth while to record at once these 9 fatalities in healthy persons, for the findings may indicate a more effective method of management.

Clinical Features

Some of the data on the patients are given in the accompanying table. There was little unusual about the early symptoms in any of the cases; fever, prostration, and a severe soreness of the throat were the usual complaints. After a time, which varied between twenty-four hours and forty-eight hours, there was a dramatic worsening. The patients became dyspnœic, and cyanosis developed rapidly. Cough was now complained of as a troublesome feature, and this was associated with severe retrosternal pain. Thereafter the patient started to cough up frothy fluid, which rapidly became bloodstained. Indeed, in 2 of the patients (cases 2 and 5) there was frank hæmoptysis. Admission to hospital was usually sought at this stage, and, when first seen, all the patients were regarded as critically ill. Severe dyspnœa and cyanosis were present. Clinical examination of the chest showed an impaired percussion note posteriorly, usually on both sides, with widespread moist sounds. Despite intensive therapy with various antibiotics, the administration of oxygen, and other supportive treatment, their condition deteriorated rapidly, and all died within nine hours of admission. The total duration of the illness was usually from two to three days.

1. *The Times*, Sept. 26, 1957.
2. *ibid*, Oct. 24, 1957.

Pathological Examination

Necropsy was carried out within twelve hours of death. No significant change was found in any of the viscera apart from the respiratory system.

The *trachea*, in all cases, contained bloodstained watery fluid. The whole extent of the tracheal mucosa showed severe inflammatory congestion, varying from a deep red to a dusky violet appearance. Small white areas of necrosis of the mucosa were observed in 6 of the cases.

In the *lungs* only a small proportion of alveoli contained air, and the lower lobes and dependent portions of the upper lobes were consolidated and were dark red or brown. Section showed extensive hæmorrhage into the lung parenchyma, and dark bloodstained fluid exuded copiously from the cut surface. There was no evidence of suppuration or abscess formation. A typical pneumonic consolidation of lobar type was seen in only 1 instance (case 2). Small effusions were present in both pleural cavities in 3 patients (cases 1, 2, and 5): the fluid amounted to about 300 ml. and was clear and straw-coloured.

Histological Examination

The *trachea* showed severe congestion of the distended capillaries and small vessels in the submucosa. Throughout most of the upper respiratory passages there was widespread necrosis of the epithelium; in many places the epithelium had completely disappeared, leaving a raw ulcerated surface covered with a film of fibrin. In other areas the epithelium had desquamated and only the basal cells were left. In some portions of the submucosa lymphocytic infiltration was seen, but this was not pronounced; indeed, the more striking characteristic was the paucity of cellular reaction. Clumps of gram-positive cocci were present on the surface and in the necrotic epithelium of the trachea.

The *lungs* everywhere showed severe capillary congestion, and there was evidence of widespread consolidation. In some areas the alveoli were filled with a protein-rich exudate, but in others hæmorrhage had occurred. In large portions of the lungs the alveoli were completely filled with blood. In no case was any cellular reaction seen in the lung parenchyma, and the absence of polymorph cells in the alveolar exudate was striking. Large numbers of gram-positive cocci were present in the small bronchi and in the lung alveoli.

Bacteriological Examination

Specimens were examined from the trachea, from the lung, and from the pleural fluid when present. Direct examination of smears showed that, although there were

DATA ON 9 CASES OF FULMINATING INFLUENZA

Case	Date of death (1957)	Age (yr.)	Sex	Duration of illness (days)	Organism in lung
1	Sept. 16	9	F	2	*Staph. aureus*
2	Sept. 20	25	F	2	*Staph. aureus*
3	Sept. 20	31	M	4	*Staph. aureus*
4	Sept. 27	2	M	2	*Staph. aureus*
5	Oct. 4	16	M	4	*Staph. aureus*
6	Oct. 10	67	F	3	*Esch. coli*
7	Oct. 18	1	M	3	*Staph. aureus*
8	Oct. 24	47	F	6	*Staph. aureus*
9	Oct. 25	29	M	3	*Staph. aureus*

large numbers of gram-positive cocci, polymorph cells were absent. In 8 cases cultures gave heavy and, in most instances, pure growths of coagulase-positive *Staphylococcus aureus*. Sensitivity tests showed that in 6 cases these organisms were resistant to penicillin, but in all cases they were sensitive to the other common antibiotics. In none of these cases was *Hæmophilus influenzæ* seen on direct examination or found on culture. A coliform organism was isolated from the lung of case 6. Material from trachea and lungs was submitted for virus examination in all cases, and a type-A influenza virus was isolated from 3 cases, in 1 of which the virus was shown to be of the Asian strain. Examination of the material from the remaining cases is continuing.

Discussion

The pathological features of these cases are similar to those recorded in the 1918–20 influenza epidemic. A main point of difference, however, is in the bacteriology, with *Staphylococcus aureus* emerging as the predominant organism in trachea and lung—a finding which contrasts with the experience in 1918–20 when *H. influenzæ* was the commonest organism. The staphylococcal infection appears to have elicited very little tissue reaction. This apparent lack of response might be ascribed either to suppression of the tissue reaction by the virus, or to overwhelming of the host by the staphylococcal infection before a tissue response could occur. These explanations can scarcely be regarded as satisfactory. It is interesting, however, that in these cases the appearances were somewhat similar to those which I have observed in cases of fulminating staphylococcal enterocolitis, in which the abundance of staphylococci on the surface was at variance with the relative absence of local tissue reaction. Although it would be unwise to dismiss the possible toxic effects of a massive virus infection, it seems equally unwise to regard the staphylococcus as playing an unimportant role.

I suggest that in the management of these fulminating cases the following points should be taken into account:

(1) The patient should be admitted to hospital urgently in order to secure effective oxygen therapy and other supportive measures.

(2) No reliance should be placed on penicillin as the antibiotic. Since absorption either from stomach or muscle may be slow, intravenous chemotherapy seems desirable, and chloramphenicol or tetracycline should be administered. Staphylococcus antitoxin might be given intravenously at the same time.

(3) In view of the apparent improvement that has accompanied the use of the corticosteroids in the management of fulminating meningococcal septicæmia, steroid therapy might be considered. But in none of the present cases was there any evidence of suprarenal damage, which is such a usual finding in the meningococcal cases.

(4) The present cases lend no support to the view that endotracheal suction through a tracheotomy tube would be of help, since the secretions are so deeply situated in the lungs.

Summary

9 cases of fulminating influenza are described. In 8 the predominant organism found in the lung post mortem was a *Staphylococcus aureus*, which in 6 cases was resistant to penicillin.

I am grateful to Dr. N. R. Grist for virological examinations.

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ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS

DESPITE its heavy responsibilities the Royal College of Obstetricians and Gynæcologists is at present housed in wretchedly cramped conditions: the museum is restricted to one small room; the library space is so small that valuable books and pictures are packed away; the publication department of the *Journal of Obstetrics and Gynæcology of the British Empire* is confined to one small overcrowded room; and examinations have to be conducted in various outside premises.

This week, on Wednesday, Queen Elizabeth the Queen Mother was to lay the foundation stone of the new College building at Sussex Place, Regent's Park. The original design[1] has been modified, largely on the advice of Lord Nuffield, the college's most generous benefactor. On the first floor there is to be a large assembly and lecture hall (to be named the Nuffield hall), in which lectures and examinations will be held. The pathological museum (the Wellcome museum) and library will be on the ground floor. The administrative block will include accommodation for the president and common-rooms for fellows and members.

In response to the appeal for funds on the occasion of the College's silver jubilee in 1954[1], £280,000 was contributed. This was additional to £60,000 raised in 1947 for research and general purposes. Further money is needed to furnish and endow the new building. Contributions should be sent to the hon. treasurer at the College, 58, Queen Anne Street, London, W.1.

1. See *Lancet*, 1954, ii, 182.

Design for the new building.

In England Now

A Running Commentary by Peripatetic Correspondents

ANY time you're Lambeth Way (so it is written), any evening any day, you'll find them all, doing the Lambeth Walk. We've lived there for five years on and off now, and to our great regret we haven't witnessed it once. But there, customs change; the song was pre-war, and it was 1950 when we acquired our elderly residence. British reserve being what it is, we could learn nothing of our neighbours: the bloke up seemed, from his dress and odd hours, to be in London Transport, and the bloke down arrived home late with large sacks full of things which he buried by night in the garden. But we knew nothing more about them until our first November.

I noticed first that it was increasingly hard to drive up to my mews garage. I had to circumnavigate piles of wood, packing cases, and old hat-stands. Came the magic night and the entire terrace disgorged out to the back where a row of pyres reached quickly to the sky. Children ran in and out of exploding crackers, as many hours-worth of time-and-a-half burst skywards, and it was a miracle no-one was hurt. We met Ernie from two down, the gravedigger, and Charlie the plumber, not to mention Tom who drove a taxi, and Alf who was something in the docks. The busman would not join the throng and let off some discreet rockets from the fastness of his garden: our other neighbour had by then become a guest of H.M. at the Scrubs. We haven't to this day linked all these gentlemen with the various wives that trot up and down, nor with the numerous children whom I chase from time to time off our garage roof. As the last fire died down to reliable-looking embers we left our wives to wash the grime off a horde of sleepy kids and repaired to *The Grove* where over a number of pints I dealt with such questions as: "Can people really change sex?" It was a valuable introduction to an interdependent community where everyone knows someone or has a way of getting something: the wife now joins in mutual baby-minding, and the kids get asked out to watch TV (which we can't afford).

Since then Guy Fawkes has added yearly to our circle of acquaintance, and indeed to our life-experience. Last year for example was when we burnt the furniture: someone started it with an old sofa which gave off green flame. Ernie fetched a couple of old chairs, we got the big armchair with the maggots in, and before we knew where we were a sort of mass hysteria set in, and everyone was ransacking his house for combustible furnishing to add to the upholstered holocaust.

What does this year hold in store? As I go to press, the police—an inauspicious omen—have ordered the borough cleansing department to remove one very promising pile on the grounds of size. But doubtless something will brighten up the evening: always a chance my car will catch fire.

Yes, I shall be sad when consultant status and multiplying family oblige us to set out for pastures new. Whatever my wife says about the dirt, we shall always hold a pleasant set of memories in our subcortical synapses. Even though we never *did* see anyone doing the Lambeth Walk.

* * *

Last week my three-year-old daughter's breakfast was ruined by her inability to open the *Lancet's* wrapper and we were subjected to dismal wails of "where's the pointing finger?" However, life is now normal again. After helping me to unpack the weekly groceries she came to me all smiles carrying a roll of useful domestic paper which still bears on its wrapper a reinforced strip and a pointing finger.

I draw no conclusion, but I must confess that I am wondering how many of these rolls can be bought for the price of a year's subscription to *The Lancet*.

* * *

We decided that a few days by the sea, away from "all thoughts of patients," would be just the thing to set us up for the winter, and in the autumn, we felt, even a resort on the South Coast would hardly be crowded. We proved to be right. The ordinary holiday-makers indeed had gone home, but in our hotel at any rate their place had been taken by very different types, and, since the training of a lifetime will not be denied, it was impossible not to speculate and to make spot diagnoses.

There were the father and the sad-faced mother of an obviously mental defective son, perhaps 15 years of age. A pathetic figure, he spent his time thumbing over his book of nursery-rhymes, or lolling vacantly in front of the television screen. An elderly woman—we thought a spinster (at any rate she was not wearing a wedding ring)—was accompanied by another of about the same age (was it her sister?) and her typical gait as she stamped in and out of the public rooms gave her lower-motor-neurone lesion away. Then there was the poor old boy, crippled with rheumatism, who just managed to propel himself from place to place with his crutches and with the help of his wife close at hand. An attractive married woman in her early forties was looking after her aged mother whose perceptive deafness was all too plain. Though she appeared to be able to hear better when her hearing-aid was in action, she often forgot where she had left the battery. There were other signs of a failing memory, so we thought a cerebral arterio-sclerosis a fairly safe bet. At the table next to us on the right in the dining-room was a tall lean character with the facies and idiosyncrasies of the dyspeptic, and at the one on the left sat a rather blowsy coarse-skinned woman with the croaking voice suggestive of a sub-thyroid state.

Besides ourselves and the various "attendants," there seemed to be only four whole people in the place; and since they played canasta incessantly, we thought they were probably obsessionals.

* * *

One of the occupational hazards of being a house-physician is the ease with which you are admitted to the side-ward. There are no facilities for being ill, peacefully and undiagnosed, in your own room. Your attempt to do this is promptly thwarted and you are pushed in a wheel chair ignominiously to the ward, via the X-ray department. The bed is warmed, Sister is smiling, the nurses look embarrassed, and rumours rampage among the patients. Your notes are kept by the Chief in a secret place in Sister's office, but your temperature chart is displayed to alarm you. You hear rumours that your blood-count is unlike any ever seen before and the consultant pathologist appears in person to repeat it. You accept the inevitable and settle down to the novel you haven't had time to read before, and when the standard hospital dinner is being served in wards and staff diningroom alike, you hear, with some satisfaction, Sister shouting to the orderly, "That isn't good enough for Doctor. Cook him an egg." You prepare for peace and quiet and enjoy the prospect of being spoilt.

There is no doubt that Sister is delighted to have you there and that she intends to keep you. For months, she says, she has been ringing round the hospital for you without being able to find you. Now she has you there, day and night.

There are those forms, Doctor, that you forgot to sign yesterday, and please write up Mr. Jones for his digitalis. The new patient is not so well; do you think he ought to have an enema? How lucky that you are here, Doctor, Nurse has just cut her thumb and you can sign the accident book. Please have a look at it in case it needs a stitch. Oh dear, that drip has stopped again; Doctor, just come and get it going again, will you? And while you are up, Doctor, it's time to take blood for the sugar-tolerance test, and the coronary hasn't had his prothrombin-time done for two days. I'll just put the syringes in to boil.

The Chief can't understand why you don't get better, but refuses to believe that you would have recovered more quickly alone and undiagnosed in your room.

* * *

News from school.—Autumn, I may say, is rampant here, but there is still about a month before the heating goes on. Long-leave day is Nov. 9. Thus life goes on from day to day, week to week, like a monstrous toad crawling across the land, crushing hopes and fears in its path.

Letters to the Editor

THE MINISTER AND WHITLEY

SIR,—My branch has instructed me to write to you, on the suggestion of several members of the medical profession, regarding the facts relating to the Minister of Health's rejection of the 3% pay award made by the Health Services Whitley Council.

The increase was agreed at a special meeting of the Administrative and Clerical Staffs Whitley Council on Oct. 11 and was to take effect from Oct. 1. The amount of 3% was proposed by the management side itself—made up of representatives of the Ministry and hospital authorities—and was accepted by the staff side, although it had asked for and considered itself entitled to a more generous award.

The Minister's veto, therefore, amounts to direct and arbitrary interference with the decision of a properly constituted Whitley Council. It represents the negation of collective bargaining—something every trade unionist must resist—and is an incitement to direct action which NALGO and the other unions in the Health Service have been most anxious to avoid.

The decision is completely unjustified. For many years, salaries in the Health Service have been well below those in comparable employments—including the Civil Service, local government, teaching, and the nationalised industries—and have fallen far behind the increase in the cost of living. As a result, as the recent report of the Select Committee on Estimates made clear, recruitment of administrative and clerical staff has fallen seriously and there are grave staff shortages, threatening the present and future of hospital administration.

We must, therefore, oppose the Minister's action with all our power, in the public interest no less than in the interest of the staff. I am sure that all the other unions concerned will support us in that action.

We shall be considering our future policy on Nov. 6, when there are to be separate meetings of the trade-union and management sides of the Whitley Council, followed by a joint meeting of the full council.

Since 1948, the cost of living has increased by 51% and wage-rates in general have increased by 66%. The following figures show how far Health Service salaries have fallen behind :

1948 salary	*Present salary*	*% increase*
£385	£515	39
£495	£659	33
£660	£862	31
£760	£949	29

In other words, in terms of what their money will buy, all these Health Service employees are a good deal worse off than they were nine years ago—the first by £76 a year, the second by £88 a year, the third by £135 a year, the fourth by £199 a year. That is why Health Service officers consider this award to be more than justified and why they find the Minister's action so incomprehensible.

M. TANDLER
Secretary, Middlesex Executive Council (N.H.S.) Branch, National and Local Government Officers Association.
London, N.W.1.

P.A.S. AND THE PATIENT

SIR,—I read with interest the article last week by Dr. Dixon and his colleagues on outpatient P.A.S. therapy and your annotation on this important subject.

One reason not mentioned for patients discontinuing P.A.S. is that the urine stains their underclothing. I have at the moment a patient who stopped taking P.A.S. as an outpatient because he had ruined two pairs of trousers. This objection to P.A.S. may not be encountered frequently because of a sense of delicacy on the part of patients ; but the general use of an agent capable of removing P.A.S. stains might help to make this drug less unpopular.

Bournemouth. D. J. AP SIMON.

ESTIMATION OF PLASMA-PROTHROMBIN

SIR,—The letters of Dr. Biggs and Dr. Toohey (Oct. 12) contain statements which one can justifiably question. Dr. Biggs asserts that Owren's prothrombin-proconvertin method "is superior to the unmodified one-stage test for the control of anticoagulant therapy." Her reasons for this are :

(1) The test measures the combined deficiency of factor VII and prothrombin ;

(2) The random variations are less than with the unmodified test ;

(3) The results are reasonably reproducible from one batch of reagents to another ;

(4) The test records values in near-normal ranges.

If the one-stage prothrombin-time test is carried out according to the original directions, it measures prothrombin-proconvertin activity accurately and precisely. It is unnecessary to supply extra fibrinogen and labile factor (factor V) because these are very rarely reduced to a level at which they affect the prothrombin-time, and they are not diminished by drugs of the dicoumarol type. As to random variations, I can merely say that my associates and I have obtained twelve seconds *consistently* on normal human plasma since 1938. Of the several hundred lots prepared with the acetone-dehydration procedure, we rarely obtained one that did not have this constant activity. I have material prepared nearly twenty years ago which has been stored in a vacuum at room temperature and still gives a prothrombin time of twelve seconds. In regard to the fourth point, an examination of my prothrombin curve shows that a decrease of the prothrombin activity to 50% causes an increase of three seconds in the clotting-time. Any qualified technician can be trained to measure prothrombin-times within an accuracy of a half second. As a matter of fact, when the plasma is diluted with an equal volume of saline (not adsorbed plasma), the change in prothrombin-time with decreasing prothrombin-activity can be sufficiently accentuated to permit measuring a decrease from the normal to the 80% level.

Contrary to Dr. Toohey's observation that saline extracts of human brain give more constant and reproducible results than the acetone-dehydrated product, I have found quite the opposite. I was limited to saline extracts of brain and lung in my earlier studies (1932–37), and I remember the discouraging results I obtained. It was only after I developed the acetone-dehydrated rabbit-brain reagent that I began to obtain results which I could duplicate within a fraction of a second twenty years later, and, if I may be permitted to be a bit facetious, to employ a biological method to test the accuracy of my stop-watch.

It seems hazardous to make claims that one procedure is superior to another in the control of anticoagulant therapy, especially when so little is definitely known concerning the modus operandi of the dicoumarol type of drugs. The objective is usually to give enough of the drug to maintain a prothrombin level just short of a hæmorrhagic state. As a result of my studies, both experimentally and clinically, I have determined that the critical level at which a hæmorrhagic tendency sets in (for vitamin-K deficiency, or dicoumarol) is about twenty seconds, with the normal control of twelve seconds.

Since both rabbit and human brain, when properly dehydrated with acetone, yield a product that gives a prothrombin-time of twelve seconds, the two can be used interchangeably in the clinical laboratory. Rabbit-brain product has the advantage of being obtainable commercially. Few technicians are now expected to make their own reagents, and therefore many laboratories will be limited to commercial thromboplastin.

I am fully in agreement with Dr. Toohey that the results should be reported in seconds and the normal

control time given. This applies also to the thromboplastin-generation test, the prothrombin-consumption time, and other procedures of this type. If the editors of journals would insist on this requirement, the task of evaluating the significance of results would be greatly simplified.

Marquette University, Milwaukee, Wisconsin. ARMAND J. QUICK.

BACTERIA AND INFLUENZA

SIR,—The great value of your leading article of Oct. 26 lies in relating experiences collected in the past to facts elucidated in more recent times and particularly to observation during the present influenza epidemic. One cannot but agree wholeheartedly with your views and statements, but I would differ in one minor yet perhaps not unimportant point.

You state that *Staphylococcus aureus* as well as the pneumococcus and hæmolytic streptococcus are sensitive to erythromycin "but unfortunately *H. influenzæ* is usually not."

During the past 5 years or so I have tested a great number of *H. influenzæ* strains for their sensitivity to all antibiotics, and with very few exceptions, all have been highly sensitive to comparatively low concentrations of erythromycin. This in itself might not be sufficiently important to be stressed at the present time were it not for the fact that the *Staph. aureus* strains which I have isolated from four influenza cases with fatal staphylococcal pneumonia were resistant to 2 or 20 units per ml. of penicillin while erythromycin appeared to be the most effective antibiotic in vitro. Thus, judging by laboratory data, erythromycin is the best antibiotic to try first in influenzal pneumonia.

Department of Bacteriology, School of Medicine, Leeds. K. ZINNEMANN.

INFLUENZAL PNEUMONIA TREATED WITH CORTISONE AND ANTIBIOTICS

SIR,—I was much interested in the letter from Dr. Plaza de los Reyes and his colleagues (Oct. 26) and their successful use of cortisone in critically ill patients. A similar observation was made here.

Influenza was fairly severe in the Midlands, and from August to October about 150 patients with post-influenzal pneumonia were admitted to this hospital. We were struck by the severe toxicity and extensive involvement of the lungs. In spite of intensive treatment with antibiotics, oxygen, and cardiac stimulants there was a mortality of 10%—all in patients with other underlying conditions such as chronic bronchitis and emphysema or valvular heart-disease. Observing the "shock-level" blood-pressure and lack of resistance, we first used 100 mg. hydrocortisone intravenously in 2 obviously moribund patients who had pronounced heliotrope cyanosis. The result was dramatic.

A few days later the following patient was seen:

A woman, aged 28, previously in good health, para 3, 6 months pregnant, was admitted with pneumonia involving the whole of the right lung and the left upper lobe. Temperature 104° F., heliotrope cyanosis. After 48 hours' treatment with large doses of antibiotics, analeptics, and oxygen, she appeared moribund. Prednisolone 10 mg. was given initially, and then 5 mg. t.d.s. 24 hours later she was afebrile and not cyanosed, and there was some air entry over all the affected lobes. 3 days later she was able to get up.

It was then decided to use prednisolone in average doses (15 to 30 mg. daily) in severely ill patients with extensive pulmonary involvement, toxicity, and low blood-pressure. Without exception the results were gratifying.

It appears that in these cases prednisolone is as effective as cortisone, not only correcting adrenal insufficiency but also helping to absorb exudate.

Leicester Isolation Hospital. C. E. ROTEM.

RESPIRATORY FAILURE IN POLIOMYELITIS

SIR,—In his interesting article of Oct. 26, Dr. Sandiford seems to suggest that the standard iron lung is unsuitable for the transport of "dry" patients with respiratory paralysis. Since July, 1955, however, we have brought back 15 such patients to the regional unit at this hospital, using a Both respirator and a special ambulance provided by arrangement with the senior administrative medical officer of the N.E. Metropolitan Regional Hospital Board and the county medical officer of health. The age of the patients ranged from three to thirty-five years, the distance travelled from ten to fifty miles, and the time taken from half-an-hour to three hours. During these journeys the pump unit was operated by hand, but this did not appear to tax our team or our helpers too severely. Provided four adults of reasonable physique are available, the movement of tank-cum-patient into and out of the ambulance is not very difficult, especially after some practice. All 15 patients stood the journey well, and only 4 needed tracheotomy later. As Dr. Sandiford says, intubation may convert a "dry" into a "wet" patient, and tracheotomy, though often a lifesaving measure, should be avoided whenever possible. The surest way of doing so is to transfer every "dry" patient in a tank respirator.

I also suggest that when intubation is necessary, and provided that the stomach is empty and the patient not seriously hypotensive, general anæsthesia with thiopentone relaxant, and pethidine is much kinder and no less safe for the patient. Moreover, it affords good conditions for the maintenance of intermittent positive-pressure respiration en route.

Rush Green Hospital, Romford, Essex. E. JAMES.

TREATMENT OF TUBERCULOUS MENINGITIS

SIR,—If, as the Scottish Joint Committee state in their article on Oct. 19, "the primary objective of the trial was to find if the reduction or elimination of intrathecal therapy made any difference to the efficiency of chemotherapy in tuberculous meningitis" (and the conclusion arrived at was that "the reduction of intrathecal therapy is rational"), is it not essential that in the treatment groups studied the control therapy and the analytical therapies should differ only in respect to the intrathecal streptomycin? We find, however, that their "standard" group had no isoniazid (except when the physician felt it necessary to add it). Likewise, the three groups had different amounts of intramuscular streptomycin.

All the trial shows is that the three forms of treatment were roughly similar in efficiency; and I doubt very much, granted the number of cases was sufficient, if a statistician could say anything at all about the merits of intrathecal streptomycin.

That intrathecal streptomycin has its place in the treatment of certain cases of tuberculous meningitis is well demonstrated by the following case:

A boy of 17 years with tuberculous meningitis, who had a tuberculoma in his lung and from whose cerebrospinal fluid tubercle bacilli were cultured, was admitted to hospital on June 29, 1957, the eleventh day of his illness, as a case of poliomyelitis. Two days later he was not improving, X-ray of the chest showed a shadow and the provisional diagnosis of tuberculous meningitis was later confirmed. His condition on that day was as follows: temperature 101°F, signs of meningitis, mild confusion and drowsiness, objective vertigo and diplopia without strabismus; C.S.F. slightly opalescent, 55 polymorphs, 350 lymphocytes, 70 red cells per c.mm., chlorides 640 mg., protein 400 mg., sugar 31 mg. per 100 ml. On July 2 he was started on isoniazid (600 mg. per day), P.A.S. 20 g. per day, and streptomycin 1 g. intramuscularly twice daily.

For three weeks his general condition remained unchanged and every evening his axillary temperature reached between 100 and 102°F. He was still drowsy, mildly confused, and diplopic. The C.S.F. on the 21st day of treatment (July 22) was recorded as follows: turbid, cells 575 per c.mm. (40%

polymorphs, 60% lymphocytes); chlorides 700 mg., protein 240 mg., sugar 80 mg. per 100 ml.

He was started on daily intrathecal streptomycin and two days later his C.S.F. was clear and colourless and his cells were down to 50 per c.mm. Within a week he was sitting up with no vertigo and no diplopia. His temperature became normal within twenty-four hours of starting intrathecal streptomycin and has remained so. Four months later he is getting up and has no neurological sequelæ.

I mention this case because of the present-day trend towards abolition of intrathecal streptomycin as unnecessary, and because I also, for three weeks, thought that intrathecal streptomycin had nothing to offer in tuberculous meningitis.

Coventry. DONOUGH MOYLAN.

EXPECTORANTS AND SPUTUM VISCOSITY

SIR,—It is surprising that Dr. Forbes and Dr. Wise (Oct. 19) should have confined their experiments to 7 patients with pulmonary tuberculosis and 2 with bronchiectasis. Their conclusion that none of the drugs used had any influence on the viscosity (or the amount) of sputum can be valid only for their particular sample of patients, but not for the vast number of patients with chronic bronchitis, emphysema, and bronchial asthma, in whom potassium iodide in doses of about gr. 15 (1 g.) t.d.s. has been found indispensable by others and by myself. The experimental basis of this treatment was laid down by Gordonoff [1] and has so far not been challenged.

London, W.1 H. HERXHEIMER.

THE PUZZLE OF TROPICAL EOSINOPHILIA

SIR,—Your annotation of Sept. 7 contains a statement which is apt to mislead. I quote (changing only the reference numbers): "Meyers and Kouwenaar,[2] Van der Sar and Hartz,[3] and others have found evidence of filarial infection, positively identified as *Wuchereria malayi*,[3] in lymphatic glands of a few patients who had eosinophilia and pulmonary symptoms." Reference to these two articles, however, reveals that identification of the species of filaria was not possible in any of the patients; Van der Sar and Hartz add that only *W. bancrofti* is known in the locality concerned (Curaçao).

An association between *W. malayi* and a condition resembling tropical eosinophilia has indeed been described by Friess and his colleagues [4] and Winter.[5] Again, only a few patients were involved, and most of them had some degree of lymph-gland enlargement, which is not a common feature of tropical eosinophilia. The syndrome described appears to have developed in patients who were already adults when first exposed to infection, and this may explain why it has not been observed in the endemic areas of filariasis in Malaya (nor I believe elsewhere), where exposure to infection from infancy is the rule.

In contrast to these rather limited proofs of infection with any species of filaria, Danaraj and his colleagues [6] describe tropical eosinophilia in Singapore as having no association with filariasis. There the condition occurs mainly in Indians, and responds rapidly to treatment with organic arsenicals or diethylcarbamazine; this response is accompanied by a change in complement-fixation test (using *Dirofilaria immitis* antigen) from positive to negative.

If then, as seems most probable, tropical eosinophilia represents an allergic reaction to the presence of some species of worm, nevertheless the wide geographical distribution and the conflicting evidence regarding filarial infection suggest that more than one species of worm is likely to be involved. The results of treatment do not contradict this supposition; diethylcarbamazine has an action on nematodes as different as wuchereria and ascaris. In this region, the tendency for tropical eosinophilia to affect mainly Indians, who form a relatively small proportion of the population, remains unexplained; could we but find the reason for this, it might provide a key to the puzzle.

Institute for Medical Research,
Kuala Lumpur, Malaya. T. WILSON.

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ANÆSTHESIA IN DYSTROPHIA MYOTONICA

SIR,—Recently attention has been drawn to the dangers of giving thiopentone to patients suffering from dystrophia myotonica.[1–3] To date we have collected records of 20 patients with dystrophia myotonica who have had anæsthetics. 10 of these patients had some anæsthetic complications and, of these, 3 died.

I should be grateful to receive information from any of your readers who have anæsthetised patients suffering from this disease, even though the response to anæsthesia has not been abnormal.

Department of Anæsthetics,
University College Hospital,
Gower Street, London, W.C.1. LEON KAUFMAN.

HAZARDS OF RENAL BIOPSY

SIR,—The most important complication of renal biopsy is uncontrollable bleeding. This may be manifested either as continued hæmaturia or as the development of shock with a large retroperitoneal hæmatoma. As this risk is by no means negligible, any condition which is found to add to the dangers should be regarded as a contra-indication. Kark and Muehrcke [4] recorded lack of cooperation in the patient; any bleeding tendency; suspected cystic kidneys, hydronephrosis, neoplasm, or perinephric abscess; and a single kidney. In addition, they recommended avoidance of the left kidney where possible, and more recently Muehrcke and Pollak [5] have suggested that oliguria, with a rising blood-urea above 100 mg. per 100 ml., should also serve as a contra-indication to biopsy. De Wardener and Hutt [6] reported gross hæmaturia with ureteric colic due to the passage of blood-clot in 2 patients, 1 of whom had hypertension. They hold that serious bleeding is more likely in such cases, and advocate biopsy only where the diastolic pressure is below 100 mm. Hg, achieving this with hypotensive drugs if necessary. In their article of Sept. 21, Dr. Ross and Dr. Ross,[7] observing similar contraindications, record the development of a large retroperitoneal hæmatoma in a patient who had malignant hypertension with uræmia.

In a recent personal series of renal biopsies, performed on 29 patients, at least a microscopic increase in hæmaturia was encountered in all but 3 of those from whom adequate tissue was obtained. In only 1 case, however, was bleeding serious, and this was in the one patient of the series with definite renal calcinosis.

A single woman, aged 41, who gave a ten-year history of recurring attacks of renal colic, presented the biochemical features of renal tubular acidosis. Her general condition was satisfactory, her blood-pressure was 120/80 mm. Hg, and investigation showed no evidence of a bleeding tendency. Despite a normal blood-urea, renal-clearance studies revealed considerable impairment of glomerular filtration-rate and effective renal plasma-flow. Radiographs showed bilateral ureteric and renal calculi, with additional calcinosis in the renal substance. Tissue was readily obtained from the right

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kidney and biopsy showed evidence of pyelonephritis. Urine passed 2 hours after the removal of the specimen was heavily bloodstained, and brisk hæmaturia continued for the following 9 days, during which time the hæmoglobin level fell from 12·1g. to 9·4 g. per 100 ml. She had no colic, and tenderness in the renal angle was slight. Her subsequent course was satisfactory, and the hæmoglobin level was restored to normal by transfusion of two pints of blood.

It seems likely that heavy calcification may prevent the renal tissue from closing over the site of entry of the needle, thus prolonging the bleeding. The alarming experience with this patient suggests that significant renal calcinosis should be regarded as a further contra-indication to renal biopsy.

Postgraduate Medical School, London, W.12. LAVINIA W. LOUGHRIDGE.

A TOE-RAISING ANKLET

SIR,—Toe-raising appliances in common use tend to be either unsightly or cumbersome, and often restrict the mobility of the ankle or knee. The simple anklet and spring illustrated here, which was designed by Mr. Kenneth Harris, M.S.R.G., superintendent remedial gymnast, overcomes these disadvantages. It has been used effectively both for paralytic talipes in poliomyelitis and for "drop foot" in hemiplegia.

It is simple to apply, and has often made it possible to dispense with below-knee callipers. The device consists of a padded leather anklet 4 in. wide buckled firmly above the ankle. Attached to the anklet is a leather strap carrying a small 'Terry' spring which fastens by a light clip to a small metal D-piece and leather tag stitched to the shoe. This tag and D-piece may be placed centrally or (see fig.) on either side of the sole at the level of the metatarsal heads to control varus or valgus deviation of the foot as required.

Where, in addition to foot drop, there is severe valgus over-stretching and deformity, stability can be increased by an additional leather strap on the inner side of the shoe secured to an extra buckle on the anklet.

Two different strengths of spring are needed—one with a light pull for paralytic patients, and one slightly heavier for hemiplegic patients.

The anklet is made in two sizes—children's and adult—by A. C. Daniel & Co. Ltd., 41, New Cavendish Street, London, W.1, from whom supplies may be obtained.

Highlands General Hospital, Winchmore Hill, London, N.21. E. T. BAILEY.

MARGINAL-PUNCHED CARDS

SIR,—When Dr. J. Maclean Smith's excellent article [1] was published I had the problem of applying an immunisation programme to the local population of Christmas Island, and following cases of pulmonary tuberculosis and Hansen's disease. I am also interested in the association between occupation and disease. Thus I adapted the cards to the particular medical problems here.

This particular card meets our system here of vaccinating against smallpox at 3 months of age and again on school entrance at 7 years of age. Immunisation with the triple antigen is done at 7, 8, and 9 months and again at 5 years of age. Active immunisation against tetanus is applied to the whole population, the under 5s having been immunised in a mass programme a short while ago. All between 6 months and 20 years of age are vaccinated with B.C.G. Space is provided for recording separate immunisation against diphtheria and pertussis.

Blood-groups are also included as the information is invaluable when seeking a donor quickly.

Cross-reference to other records is provided, hence the headings: Works number, Occupational code no., Chest X-ray, Inpatient records, &c.

Although, as clinicians, we are reluctant to face clerical work and statistics, these are essential for the efficient application of our endeavours to win the battle with disease even on an island of sixty square miles with a population of 2600.

Christmas Island. E. R. BLAY.

1. Smith, J. M. *Lancet*, 1955, ii, 919.

EARLY ADMISSION TO HOSPITAL OF MENTALLY DEFECTIVE BABIES

SIR,—As a social worker concerned with the statutory supervision of mental defectives ascertained by the local authority, I often have under my supervision a defective baby awaiting permanent care in a mental-deficiency hospital. Usually the parents have been advised, often within 2–4 weeks of the baby's birth, to take this step because the child has many abnormal features which will hamper its development. This may be *absolutely* true when the nervous system is grossly impaired, but it is true only *relatively* in some types of medium-grade defect, such as mongolism or secondary amentia due to limited brain damage; and it may not always be appreciated by the doctor attending the mother and baby in the neonatal period that such a child may be able to develop compensatorily in social capacities if given good maternal care and eventual daily training at an occupation centre.

Two cases of high-grade (judging from their developmental pattern in the first 24 and 6 months of life respectively) mongol babies, both delivered at a well-known teaching maternity hospital, come to mind. Both sets of parents were strongly advised at the hospital to ask for the child's early admission to a mental-deficiency hospital, and both had the false impression that an early vacancy would be provided; thus the idea of "painlessly putting the child away," with its psychological counterpart of dismissing it from consciousness, was reinforced for them. In each case the mother was a strongly maternal woman, appearing older than the husband and clearly the more mature partner of the marriage, and when she discovered that she might have to keep the baby for as much as a year, watching it grow, she developed strong conflicting feelings about the situation—on the one hand wishing that she could keep the child permanently at home, and on the other fearing to go against the expert medical advice and the earlier decision.

It could be said that in each case this conflict was stimulated and encouraged by the doctor's recommendation, which was made initially to the young husband alone when he was in an intensely emotional state, shocked by the advent of an abnormal offspring and missing the support of his wife, from whom he had to conceal the blow in the first few days after the baby's arrival.

One father said that the diagnosis had been given to him in a very uncompromising, almost brutal, manner by a junior house doctor, who had offered to bring in a second opinion. The diagnosis was confirmed, but by a pædiatrician rather than a consultant specially qualified in mental deficiency. One cannot escape feeling that if such a specialist had been consulted he would have succeeded in presenting a truer picture of mongolism and its potential development to the parents, thus allaying many of their unfounded fears about the child's condition. It has been clear, from discussing the baby with the parents, that they have interpreted the bald statement (no doubt given in good faith by the doctor, who did not wish to raise false hopes of fundamental improvement) "will never be normal" in the light of terrifying fantasies of their own, and that they have no conception of what an older mongol child can achieve in the way of social adjustment. Their ideas were based on a low-grade idiot girl, of an entirely

different clinical origin, whom they had seen about in their neighbourhood.

This family has one older child, aged 7, and naturally they are reluctant to risk another pregnancy. They wanted a second baby so that the elder one should not be an only child, and they have been faced with the paradoxical situation of having been advised to send the defective baby away because mental defect makes difficulties for the normal siblings. This older child has become very attached to the baby and is distressed that it eventually has to go away. This is a small family in which a mongol child could easily have been reared, not only without detriment to the other members but possibly making a positive contribution in that the size of the family would have been a healthier one. If, instead of being told that the child should soon be removed from home, the parents had from the start been helped to accept it and its mental defect and had had its assets as well as its limitations explained to them, they might have been able to give the child a real chance of upbringing in the home, with a strong likelihood of its being assimilated into the family ultimately.

Apart from the fact that the mongol child would have had the advantages of life within a family in the community, instead of the substitute care of an institution, the mother would have been spared the unhappiness and conflict involved in parting with it, and the risk, which cannot be overlooked, of subsequent damage to her mental health resulting from rejecting an especially weak offspring about whose condition she already may feel guilty.

In view of these considerations, and the recommendations of the report of the Royal Commission on the Law relating to Mental Illness and Mental Deficiency, which supports the absorption of the mentally handicapped into the normal community, it seems desirable for doctors faced with the diagnosis of early defect and the duty of telling parents, to give more thought to the social factors involved rather than to assess the case on purely clinical merits. Though a mentally defective baby is biologically very imperfect, and baffling in that there is no known cure for its condition, it must also be regarded as a social entity with a family behind it. The parental concern which has been building up during pregnancy and is at its most potent when the baby has arrived cannot be inhibited suddenly because *biologically* the offspring is not worthy of it, and grave psychological damage may result from a situation in which frustration is encouraged in a particularly strong area of instinctual feeling.

London. MARGARET ADAMS.

EFFECT OF ANTIBIOTICS DURING HYPOTHERMIA

SIR,—The only efficient means of relieving grave oxygen deficiency is lowering the organism's temperature. Under the protection of the chlorpromazine "cocktail", hypothermia has not infrequently made it possible to save life in severe circulatory failure. Since this failure often follows infectious disease, the question soon arose of how antibiotics would act at temperatures lower than 37°C.

From our first trials, made by the plate method, it seemed that the action of penicillin, streptomycin, and chloramphenicol was increased at temperatures lower than normal. At 28°C the shigella strain tested was sensitive to penicillin. A strain of *Escherichia coli*, which at 37°C was resistant to streptomycin, became sensitive to that drug at a lower temperature. A penicillin-resistant staphylococcus also lost its resistance.

In further studies the tube dilution method was used. Equal amounts of bacterial strains were inoculated into tubes containing broth, and the rate of growth was determined by densitometry every 2 to 3 hours for 24 hours. In this way normal (control) growth curves were plotted for different temperatures between 37°C and 21°C. Identical amounts of the same strains were then inoculated into broth containing penicillin or streptomycin in various dilutions; after incubation for 24 hours at these temperatures, the growth curves were plotted in the same way as the control curves. Penicillin was used in dilutions of 4, 1, 0·25, and 0·06 units per ml. and streptomycin in dilutions of 64, 16, 4, and 1 unit per ml.

Growth of the staphylococcus strain tested was inhibited by penicillin at 37°C only by 4 and 1 unit per ml. but at lower temperatures 0·06 units per ml. gave complete inhibition. Of streptomycin, 64 units were needed to inhibit growth at normal body-temperature, but at 27°C only 1 unit. The *Esch. coli* strain tested was completely resistant to 4 units of penicillin and to 64 units of streptomycin at normal temperature; at lower temperatures, growth was completely inhibited by these dilutions. The *Shigella paradysenteriæ* (Flexner) strain tested, wholly resistant to penicillin at 37°C, was fully inhibited by 0·06 units per ml. of that antibiotic at lower temperatures. *Salmonella typhi* also became sensitive to both antibiotics at lower temperatures.

To establish that, when the temperature is lowered, bacteria become more sensitive to antibiotics, many more observations would be needed. Besides penicillin and streptomycin, the other antibiotics would have to be tested. Our results, however, were uniform in that in no instance has antibiotic action been weakened by decreasing the temperature, and it seems that these drugs are at least as effective in hypothermia as at normal body-temperature. Their action may perhaps be enhanced by lowering body-temperature.

First Department of Pædiatrics, Budapest University Medical School, and State Institute of Public Health, Budapest, Hungary. P. V. VÉGHELYI, MARTHA K. SCHWANNER, ST. FÜRÉSZ.

BEHAVIOUR STUDIES IN MEDICAL RESEARCH

SIR,—Dr. Chance's timely article (Oct. 5) rightly points out the frequent lack of correspondence between the phenomena of "experimental neurosis" in animals, and human neurotic disorders—a correspondence so often uncritically accepted. To avoid this, it is possible to define human neurosis behaviourally—that is, without recourse to the patients' subjective experience as verbally reported—and to apply the resulting criteria to the results of animal studies. When that has been done, the lack of correspondence is even more apparent than is suggested by Dr. Chance's single criterion of unusual—that is, statistically abnormal—behaviour.

However, it is surely incorrect to assert the absence of any organising system for the many different aspects of mammalian behaviour studied in the laboratory. Modern learning theory, based on Hull's [1] adaptation of Pavlov's basic conditioned-reflex concepts, provides such a formulation. It is widely applicable, even to human behaviour, as Eysenck [2] has recently shown. This is not to say that the careful observational studies of the integration of patterns of behaviour of the sort that Dr. Chance advocates are not useful, but rather that they are more applicable at lower phylogenetic levels, as in birds, fishes, and insects, where much of behaviour is organised in innate reaction patterns to fixed stimuli. Mammalian behaviour, including that of both rat and man, is in general vastly more flexible, and the importance of *learned* responses correspondingly greater. A consequence of this is the greater relevance of learning theory in its interpretation in most of the fields of study mentioned by Dr. Chance, as compared with those theories derived from the analysis of fixed reaction patterns which he appears to favour. To take but one example from the general field of "psychopharmacology," as it is coming to be called, the study of tranquillisers: the confusion to which Dr. Chance drew attention can partly be traced to the application of Masserman's [3] "conflict" technique for the production of behaviour called "experimental neurosis".[4] This has been shown by Wolpe [5] to be a learned response based on fear, and such a conditioned emotional response develops in precisely the way predicted by learning theory. Indeed, the parameters governing its development are now quite well understood, and their

1. Hull, C. L. A Behavior System. New Haven, 1951.
2. Eysenck, H. J. The Dynamics of Anxiety and Hysteria. London, 1957.
3. Masserman, J. H. Behavior and Neurosis. Chicago, 1943.
4. Jacobsen, E., Skaarup, Y. *Acta pharm. tox., Kbh.* 1955, **11**, 117.
5. Wolpe, J. *Brit. J. Psychol.* 1952, **43**, 243.

extension in this country to the psychopharmacological study of "anxiety" in animals seems overdue.

Animal Psychology Laboratory,
Institute of Psychiatry,
University of London. P. L. BROADHURST.

MERALGIA PARÆSTHETICA

SIR,—Mr. Rhodes (Oct. 26) has done well to draw attention to this far from rare condition, for it is probably often not diagnosed and casually dismissed. Unfortunately, basing his comments upon his findings in a mere 7 cases, he states categorically "that the symptoms are never very severe . . . and in the puerperium the odd sensations disappear . . . Treatment is largely unnecessary as the symptoms are so mild."

This is certainly not always so. There are several cases in my own experience where the symptoms have greatly incapacitated the patient, who finds, for instance, that walking a short distance, or even standing over the kitchen sink, leads to great pain, and she is forced to rest. Furthermore, in such severe cases, while the symptoms invariably seem to abate considerably in the puerperium, they may continue to be a source of annoyance for many months, and even years. In one case, the patient still has trouble after six years, more marked in cold weather.

Midwifery Department,
Foresterhill, Aberdeen. JOHN F. B. WYPER.

SIR,—In your annotation of Oct. 26, you indicate that the results of operative treatment of meralgia paræsthetica are equivocal, and infer that it is not necessary.

It therefore seems reasonable for me to record that in the orthopædic service of Prof. Bryan McFarland at this hospital we have during the past two years operated on 7 cases of meralgia paræsthetica, with division of the posterior fasciculus at the lateral extremity of Poupart's ligament, and we have obtained immediate, complete, and lasting relief in every case.

Royal Southern Hospital,
Liverpool. PETER KILBURN.

EFFECT OF *d*-TUBOCURARINE CHLORIDE ON BLOOD-PRESSURE OF ANÆSTHETISED PATIENTS

SIR,—Dr. Langton Hewer (Oct. 26) has drawn attention to the inconstancy of the effect of *d*-tubocurarine on the blood-pressure of patients in whom the CO_2 levels are maintained within normal limits by controlled respiration.

I think the answer lies in the effects of controlled respiration on the circulation rather than in the pharmacological properties of *d*-tubocurarine.

With intermittent positive-pressure respiration (I.P.P.R.) the alteration of intrathoracic pressures has two main effects :[1]

(*a*) Diminution of venous return from (i) elimination of negative intrathoracic pressure and (ii) removal of raised intra-abdominal pressure with diaphragmatic descent. This will tend to lower the blood-pressure.

(*b*) In a normal person with an unobstructed airway the normal intra-alveolar pressures vary in only a small degree from atmospheric pressure.

The pulmonary capillary blood-pressure is only 2–8 mm. Hg. The inflating pressure is usually in the order of 10–15 cm. H_2O (i.e., 6·5–10 mm. Hg). If this pressure is maintained for an appreciable part of the cycle there will be considerable compression of the thin-walled vessels in the lungs with a reduction in the amount of blood circulating in the lungs. This blood enters the general circulation and tends to push up the blood-pressure.

Work by Maloney et al.[2] has shown that in the normal subject the decreased venous return is compensated for by raised systemic venous pressure maintaining venous return. It is therefore possible that the rise in blood-pressure in some curarised patients is due to :

(i) Resistance of autonomic ganglia to effect of *d*-tubocurarine (i.e., the same type of patient whose blood-pressure does not fall significantly with methomium compounds). (ii) minimal histamine release ; (iii) full compensation for loss of negative intrathoracic suction pressure on venous return ; (iv) reduced blood-volume in lungs with corresponding increase in systemic circulation.

I have found that when patients whose pressure has risen were put on a mechanical respirator with a positive and negative phase the blood-pressure tended to settle.

The mean pressure on the machine used [3] was just over 1 cm. H_2O (less than 1 mm. Hg) and thus unlikely to compress the pulmonary capillaries. The mean pressure on the same machine using only I.P.P.R. was 6 cm. H_2O (about 4 mm. Hg)—enough to affect the capillary volume.

I feel that any tendency of the negative pressure to increase the venous return will be offset by a diminution of the compensation in these patients.

If I.P.P.R. only is used on these patients one is on the horns of a dilemma since control of respiration may lead to the pressure rising as outlined above, and a patient left to breathe by himself will accumulate carbon dioxide, again leading to a rise in pressure.

Leeds. GEOFFREY B. BURCHELL.

SUBSTANCE MASQUERADING AS ALDOSTERONE

SIR,—The compound X described by Mrs. van Zeelst and her colleagues in your issue of Nov. 2, has properties closely resembling a compound we have previously designated X_6 and which we have frequently isolated following β-glucuronidase hydrolysis of urine. Under some circumstances we have observed small quantities in the free form in the unconjugated fraction.

We have found that this compound is derived from citrus fruit, and recent work from this laboratory has shown it to be non-steroidal but probably sesquiterpenoid in nature.

Our compound X_6 was first detected in pregnancy urine by de Courcy et al.[4] It was later found during investigations on heat-stress, and subsequently shown by Gray et al.[5] to be due to the ingestion of citrus fruit.

The compound III reported by Nowaczynski et al.[6] has very similar properties, and a personal communication from Dr. Genest suggests he thought the two compounds were probably identical. The accompanying table summarises the properties of the three compounds.

Perhaps Mrs. van Zeelst and her colleagues would determine whether their patient had been receiving

—	van Zeelst et al. X	Nowaczynski III	This note X_6
Ultraviolet absorption (max.)	240 mμ	239 mμ	237 mμ
Absorption spectrum in concentrated sulphuric acid	max. 280, 440 mμ min. 230 mμ	288,450 mμ 240,370 mμ	280,430 mμ 250,400 mμ
Blue tetrazolium reaction	Slightly positive	Negative	See below *
Bush fluorescence reaction	Positive	Positive	Positive
Zimmermann reaction	—	Negative	Negative
Rf values (cortisol = 1·00) :			
Bush C system	0·95 (cortisone = 1·40)		0·90 (cortisone = 1·39)
Bush B5 system	1·18 (cortisone = 1·52		1·13 (cortisone = 1·59)

* In high concentration X_6 causes some reddening of TPTZ.

1. Wright, S. Applied Physiology, p. 314. London, 1956.
2. Maloney, J. V., Jr., Elam, J. O., Handford, S. W., Balla, G. A., Eastwood, D. W., Brown, E. S., Ten Pas, R. H. *J. Amer. med. Ass.* 1953, **152**, 212.
3. Burchell, G. B. *Brit. J. Anæsth.* 1957, **29**, 183.
4. de Courcy, C., Bush, I. E., Gray, C. H., Lunnon, J. B. *J. Endocrin.* 1953, **9**, 401.
5. Gray, C. H., Hellman, K., Lunnon, J. B., Weiner, J. S., *ibid.* 1955, **12**, vi.
6. Nowaczynski, W. J., Steyermark, P. R., Koiw, E., Genest, J., Norman Jones, R. *Canad. J. Biochem. Physiol.* 1956, **34**, 1023.

citrus fruit and would check the disappearance of this compound when these substances were withheld from the diet and its reappearance on feeding them.

Department of Chemical Pathology,
King's College Hospital Medical School,
London, S.E.5. N. J. HOLNESS.

ARSENIC AND POTATOES

SIR,—Modern farming techniques for the harvesting of potatoes require waiting until the tops (haulms) die off or destroying them chemically with defoliants. When the tops have been destroyed the tractor-driver can get his machinery under the tubers and spin them out of the ground without interference from the bulky haulms, and the potatoes are then picked by hand.

Chemical destruction of the haulms shortens the waiting period before harvesting and is a useful aid in the control of potato blight. Sulphuric acid has been used for many years and it is a very efficient defoliant. It is neutralised by the buffering action of the soil, and sprayers and others dealing with it soon know of contact and there is every reason to believe that it is non-toxic to the consumer. The disadvantages of sulphuric acid as a defoliant are that it is destructive of machinery and the protective clothing of the operators, and it has to be transported to the field in road tankers because of its bulk.

In this area sulphuric acid has been recently replaced with alkaline arsenite, usually a mixture of sodium and potassium arsenite. It is sprayed in water in such concentration that approximately 10 lb. of arsenite are deposited on each acre. In the last few weeks in this district several tons of alkaline arsenite have been sprayed on to potato haulms, the major part by contractors but some farmers treat their own crops.

I have recently investigated four operators who had been spraying arsenite. Three showed an excessive excretion of arsenic in the urine and one had vomiting and diarrhœa. All operators were experienced in the spraying of toxic chemicals and were working under supervision.

Bradford Hill and Faning[1] have shown that there is an increased mortality from cancer amongst workers exposed to sodium arsenite. Operators spraying potato haulms may be exposed to arsenite for many weeks, and it is my contention that the degree of exposure should be controlled biochemically. Those spraying dinitro-*o*-cresol and the organic-phosphorus insecticides are controlled in this manner, and there are accepted limits of exposure based on biochemical analysis, the limits being those suggested by the Ministry of Agriculture, Fisheries, and Food; similar limits for arsenic have not been circulated by the Ministry.

The haulms of potatoes recently sprayed with arsenite are highly dangerous. The Ministry of Agriculture, Fisheries, and Food strongly recommends that fences and gates be secured after spraying. Despite this, in Warwickshire seven cattle have died of arsenical poisoning as a result of wandering into a field sprayed with arsenite. I have seen a large field sprayed with arsenite, unfenced, ungated, and adjacent to a large housing-estate. No warning notices were used and they are not required by Ministry regulations.

Those who advocate the use of arsenites as defoliants believe that after a period of ten days the arsenite has been washed off the haulms by rain and also oxidised to the less soluble arsenate, and then the field is safe to potato pickers. This waiting period of ten days is now required by law.

A familiar sight at this time of the year is women potato-pickers and their small children in the potato fields. They stay in the field all day eating picnic meals, without washing facilities, and are not always warned of the toxic chemical in the field. Many farmers are not aware of what they themselves or the contractors are using on their land. The arsenite products are sold under attractive trade names in containers emphasising their dangers in great detail but small print.

Medical practitioners in rural areas should be made aware that arsenical poisoning, so rare in the past two or three decades, may become more frequent, particularly amongst agricultural workers.

In this area potato farmers dependent on contractors have found it difficult to get them to spray sulphuric acid. An uneconomical harvest or spraying with arsenite were the only alternatives. The farmer saves 1½*d.* a cwt. of potatoes by using arsenite instead of sulphuric acid, and this is at the expense of leaving arsenical residues on his land.

The Advisory Committee on Poisonous Substances used in Agriculture has decided that on present information the use of arsenites on potatoes should not present a hazard to consumers. The manufacturers maintain that contamination of crops by arsenic would be negligible if applied in the manner recommended (similarly there would be no road accidents if everyone drove their vehicles correctly!). Conversation with those concerned with spraying indicates that the technique used on many farms is far from the recommended procedure. The consumer's only safeguard whilst arsenites are used on this scale is the public analyst. It is my experience that many public analysts are unaware of the widespread use of arsenite on potato crops and the possible contamination of vegetables, milk, and water with arsenite. Analysis of such foodstuffs for arsenic should become routine.

The use of arsenic in this manner is another hazard in agriculture. It is an unnecessary innovation; the reduction in cost is trifling, and the inherent dangers are appalling.

Group Pathological Laboratory,
Warwick. T. P. WHITEHEAD.

1. Bradford Hill, A., Faning, L. E. *Brit. J. industr. Med.* 1948, **5**, 1.

Parliament

The Pound and the Hospitals

IN opening the debate on the economic situation on Oct. 29, Mr. PETER THORNEYCROFT, the Chancellor of the Exchequer, said that the Government spent about a third of the national income, largely on current expenditure, but also partly on providing funds for the investment programme of the nationalised industries, the local authorities, and the social services. Turning particularly to social investment, he said the Government, as already announced, would spend £23 million on the hospital programme next year, and in the year after they planned to spend £25 million. This should allow some increase in the amount of work in 1959–60, but how much would depend on the movement of building costs.

The main school building programme, he said, would continue unchanged although some slight rephasing might perhaps be necessary in Scotland. The five-year programme for technological education would remain unaltered. Minor improvement projects would be severely restricted, and the programme for rural reorganisation in England and Wales would have to be slowed down. Housing over the past four or five years had absorbed a large proportion—between a quarter and a fifth—of our total investment, and some reduction was inevitable. As to house-building by public authorities, it was expected that rather more than 150,000 houses would be completed in 1957–58 in Great Britain. There would be a progressive slowing down so that by 1959–60 the provision would be about 80% of the present level.

To sum up, he continued, we had to be selective. We had to meet the growing requirements of the power industries and modern transport, and there expenditure would, in fact, grow. We could not do this and keep up our level of social investment without a reduction in housing—the biggest element in the public sector. That had been the broad basis of the Government's

choice. Mr. Thorneycroft emphasised that the limits he had given were expressed in money terms. If costs rose, the amount of work would have to be reduced so that the expenditure limits would not be exceeded. The Government did not intend to finance inflation.

Mr. HAROLD WILSON, who was the first speaker for the Opposition, pointed out that what he termed the cuts in the investment programme had been confined to the public sector. The Chancellor might say that they were not cuts, but in his view spreading the programme over a longer period—or, to use Chancellor's own word, " rephasing "—was in fact a cut in any one year.

Radioactive Fall-out

In answer to questions Mr. HAROLD MACMILLAN, the Prime Minister, made the following statement on the accident at the Atomic Energy Establishment, Windscale:

On Oct. 15 the Atomic Energy Authority, with my approval, appointed a committee of inquiry under the chairmanship of Sir William Penney, having as its other members Dr. Schonland, deputy director of the Atomic Energy Research Establishment at Harwell, Professor Kay and Professor Diamond, who are members of the Authority's panel of engineering consultants. This committee began work on Oct. 17 and the Authority received the report on Oct. 28. The terms of reference of the committee were to investigate the cause of the accident at Windscale No. 1 pile on Oct. 10 and the measures taken to deal with it and its consequences; and to report.

The Authority decided with my approval that an inquiry of this kind, concerned as it is with matters of a highly technical scientific character, could best be conducted by a committee of eminent scientists with experience of atomic energy who are unconnected with the industrial group of the Atomic Energy Authority, under whose control Windscale is.

I will make a further statement when the report of Sir William Penney's committee has been assessed. At the suggestion of the Authority, I am asking that the Medical Research Council should give their own independent views on the information collected so far as it affects public health.

Mr. FRANK ALLAUN asked the Prime Minister if he would state the increase in strontium 90 found in the bones of animals in Great Britain and in other effects of nuclear test explosions since the Government's statements in June and July.—Mr. MACMILLAN replied: Measurements of the extent to which soil, herbage, farm animals, and milk and other foodstuffs, have been contaminated by radioactive fall-out are made regularly at a number of localities in Great Britain. The figures are made available from time to time and the latest are contained in a further report by the Atomic Energy Research Establishment, Harwell, entitled *Radiostrontium in Soil, Grass, Milk, and Bone in the United Kingdom*. This report relates to the year 1956, but contains some provisional figures for 1957.

To ensure that the fullest possible precautions are taken, some reorganisation of the machinery for monitoring fall-out, and of the responsibility for its operation, was introduced last summer. The Agricultural Research Council has accepted responsibility for monitoring soil, herbage, farm animals, and milk and other foodstuffs, while the Atomic Energy Research Establishment will remain responsible for monitoring air and rainwater and for analysing the radioactivity present in samples of human bone.

The Joint Committee of the Agricultural and Medical Research Councils and the Development Commission on Biological (Non-Medical) Problems of Nuclear Physics, of which Lord Rothschild is chairman, has been charged with the responsibility for the oversight of this monitoring. To assist it in this task, the Joint Committee has set up a special subcommittee under the chairmanship of Dr. Loutit, director of the M.R.C. Radiobiological Research Unit.

Mr. D. W. WADE: Does not the Prime Minister agree that this is a subject upon which information as up-to-date and accurate as possible should be available to the public? Does not he agree that information collected in 1955 and 1956 might not be accurate today in view of the continuing hydrogen bomb tests and continuing fall-out? Would it be practicable for figures to be published from time to time and, if so, would they be accompanied by comment from the Medical Research Council?—Mr. MACMILLAN: If the hon. Gentleman will examine the report, I think that he will see that it is comprehensive. In reply to his question about the amount of up-to-date figures, of course a great deal of analysis by experts has to be made to see that they are correctly interpreted when made available to the public, but I will certainly bear in mind what the hon. Gentleman has said. Mr. ALLAUN: Since strontium 90 from earlier explosions will be accumulating for years hence, is the Prime Minister completely satisfied about proceeding with further explosions at Christmas Island and thus subjecting this and future generations to unknown but growing risks of irreparable injury?—Mr. MACMILLAN: Yes, Sir. It is, of course, my duty to try to balance the advantages and the disadvantages, but I am quite certain that what we have decided to do is to the general advantage of the nation.

QUESTION TIME

Hospital Building

Mrs. MANN asked the Secretary of State for Scotland which hospital buildings would be in any way affected by the credit restrictions.—Mr. J. N. BROWNE replied: There may be some adjustment of the starting dates of the major hospital building projects planned to start in 1958–59, but the programme announced on Dec. 12 [1] still stands.

Occupation of Pay-beds

Mr. SOMERVILLE HASTINGS asked the Minister how many beds were allotted to paying patients (section 5) by each of the regional hospital boards; and what was the percentage occupation of these beds by paying and ordinary patients.—Mr. WALKER-SMITH replied: The information is as follows:

Regional hospital board	No. of section-5 beds	Percentage occupation	
		By paying patients	By non-paying patients
Newcastle	241	33·5	34·0
Leeds	332	57·7	13·0
Sheffield	357	48·6	18·8
East Anglian	138	48·8	16·9
N.W. Metropolitan ..	232	52·1	17·8
N.E. Metropolitan ..	208	48·6	24·5
S.E. Metropolitan ..	371	37·4	30·4
S.W. Metropolitan ..	475	51·4	23·5
Oxford	183	45·6	15·1
South Western	322	41·7	21·1
Welsh	106	32·5	28·3
Birmingham	488	43·5	20·4
Manchester	605	42·1	26·6
Liverpool	190	33·3	21·2

Hospital Smoke Nuisance

Mr. JAMES HARRISON asked the Minister of Health if he would examine the circumstances surrounding the recent complaints concerning the smoke nuisance being committed by the authorities of the Nottingham General Hospital, with a view to an insistence on abating this nuisance and to overcoming the effect of the plea of immunity of Crown property submitted on the hearing at the Appeal Court.—Mr. DEREK WALKER-SMITH replied there was never any intention to escape obligation to abate this nuisance by pleading Crown immunity, and a scheme to abate it had, in fact, been initiated before the Nottingham Corporation served its statutory notice. This scheme, costing about £80,000, had removed the cause of complaint before the recent hearing in the Divisional Court.

Multiple Packs

Discussion with the medical profession for additional multiple packs to which only the shilling prescription charge should apply are proceeding but are not yet complete. It is hoped soon to have a pack for such conditions as boils, carbuncles, and ulcers. Packs for diabetic, colostomy, and tuberculous patients are still under consideration, but it is proving difficult to devise one pack suitable for the varied needs of different patients.

Wolfenden Report

In answer to a question Mr. R. A. BUTLER, the Home Secretary, said that the Government welcomed this logical and clear report and were grateful to Sir John Wolfenden and his colleagues for the manner in which they had performed a most difficult task. The Government were giving consideration to the reactions to the report. In view of the nature of the problem it was important to take account of public opinion, and particularly of any views expressed by hon. Members, before coming to any final conclusions on the committee's recommendations.

1. See *Lancet*, 1956, ii, 1313.

Obituary

FRANK DOUGLAS TURNER

C.B.E., M.B. Lond.

AMONG authorities on mental deficiency Dr. F. D. Turner held a unique position. His experience derived from his service to the Royal Eastern Counties' Institution at Colchester from 1905 until 1945. During these years the number of patients in the institution grew from 250 to over 2000. It was characteristic of Turner's attitude to the job that he always thought first of the patients' welfare. In early days he knew every patient and members of every patient's family personally. This he found possible until the numbers exceeded 500. Outside the hospital he fought the patients' battles against all sorts of opposition, maintaining that they had as much right to full medical care, education, training, and amusement as the rest of the community from whom they were, through no fault of their own, separated.

Turner's family had a long and honoured association with the institution. His father, John Turner, was for many years its lay superintendent, his brother the secretary, and his sister the matron. Turner himself was born in Colchester in 1871 and began his education at the Royal Grammar School there. From the Moravian School at Neuwied in Germany he went to Guy's Hospital, qualifying in 1899. In 1905, after five years in general practice in Huddersfield, he joined the staff of the Royal Institution as medical officer. On the death of his father in 1913 he became medical superintendent, and he held that post until he retired in 1945. His advice was often sought by the Government, and he was a member of departmental committees appointed by the Board of Education and the Board of Control. He was president of the Royal Medico-Psychological Association in 1933. He was appointed C.B.E. in 1942.

L. S. P. writes:

Though not himself a research-worker, Turner was a shrewd observer, and he continually encouraged others to make investigations. His firm stand against premature eugenic legislation was based mainly on his own experience with defectives. In this attitude and in his insistence on the importance of scientific research into causes he was ahead of his time, and few of his contemporary medical superintendents were in agreement with him. He hailed the discovery of phenylketonuria as a landmark indicating that hereditary mental defect was not a sign of cerebral inferiority, as was commonly believed, because here the liver was primarily at fault. Moreover, theoretically, the condition was treatable. Indeed, Turner clearly saw that objective research could eventually provide ways not only of treating and perhaps curing patients but also of raising their status in the eyes of the general public and helping to remove their stigma.

His opinions were always so modestly expressed that it was sometimes hard to realise the wealth of information on which he based them. His energy and singleness of purpose in all that he undertook, coupled with his personal kindness and his humanism, enabled him to exert a far wider influence than might be expected from his few writings. In fact, he lived long enough to see a great many of the principles which he had advocated, concerning the medical treatment and education of defectives, accepted as obvious truths by the present generation of administrators.

Dr. Turner married in 1900 Louisa Caroline Dalby. There were no children of the marriage. After he retired he continued to live in Colchester, and he died at his home there on Nov. 1.

A memorial service for the late Mr. Clifford White will be held at St. Pancras Church, Euston Road, London, on Wednesday, Nov. 13, at NOON.

Births, Marriages, and Deaths

BIRTH

BRENNAN.—On Oct. 22, in St. Stephen's Hospital, Delhi, to Joyce Brennan, M.B., wife of J. L. Brennan, M.D.—a daughter, Allison.

Notes and News

CARE OF THE MENTALLY ILL

THE Board of Control's report [1] for 1956 deals briefly with institutions accommodating mentally ill (but not mentally defective) patients. At the end of last year there were 148,161 patients under care under the provisions of the Lunacy and Mental Treatment Acts—a decrease of 1193 in the year. But the number of admissions to mental hospitals (83,994), the percentage of voluntary admissions (78·2), and the percentage of readmissions (43·1% of total admissions to care) were all greater than in the previous year. Overcrowding was calculated at 17,002—931 less than at the end of 1955. There was some improvement in the recruitment of nurses.

The Board is responsible for Broadmoor and certain Service patients; for those in some hospitals outside the National Health Service, in licensed houses, and in approved nursing-homes; and for a few in private single care. Most institutions and all single patients were visited; in general, conditions were satisfactory, but one licensed house "continues to require the attention of the Board."

WORLD DIRECTORY OF MEDICAL SCHOOLS

For its second edition the directory [2] has been enlarged to include a few words describing the salient features of undergraduate medical training in each country. The matter is entirely factual.

NEW SURGICAL JOURNALS

Prof. R. M. Janes gives three reasons why hitherto no surgical journal has emanated from Canada—financial difficulties, the feeling that there are already enough surgical journals, and uncertainty about supplies of material. The first two reasons are understandable—though it would be quite improper for a great country with twelve medical schools to consider forgoing its own outlet for the many contributions it is making in surgery, just because there are so many other surgical journals to be read. The first number of the *Canadian Journal of Surgery* [3] reveals as ill-founded the doubts as to whether there would be enough suitable material; it fully vindicates the faith of Dr. Janes and his editorial board. Meanwhile, the old world has not been lagging behind: in March *Chirurgische Praxis* [4] appeared in elegant form under the editorship of Dr. R. Wittmoser of Innsbruck, who presents a journal in which scientific and clinical work are to be blended.

HELPING SPASTIC CHILDREN

SINCE, a hundred years ago, Little first described cerebral palsy, which he thought was caused by brain injury, the diagnosis has been reasonably easy, but the treatment of this complex situation, involving not only the child's physical condition but also his mental state, was for too long ignored. All those interested in the revitalised approach to the care of spastic children—parent, doctor, or administrator—will be attracted by a new book [5] which tells how a small centre for the assessment and treatment of the many disabilities classified as cerebral palsy was set up, in the framework of the National Health Service, by voluntary effort and the good will of the associated regional hospital board.

The evolution of the clinic within the walls of an out-of-date building, formerly used as a hospital for "sick and incurable children," might well stimulate other regional boards and voluntary bodies to like enterprises. The ground-plan of the building shows how shape and site need be no deterrent, and the photographs in the book indicate many of the important features of such a clinic, where treatment and education of the under-fives go hand in hand. The chapter What is Cerebral Palsy is a useful summary of what is known about the clinical entity, but it does not pretend to be more than that. It offers no new ideas but emphasises that a retarded baby, especially

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1. Annual Report of the Board of Control to the Lord Chancellor for the year 1956. H.M. Stationery Office, 1957. Pp. 9. 8*d*.
2. World Directory of Medical Schools. World Health Organisation, Geneva, 1957. Pp. 314. £1 5*s*. See *Lancet*, 1953, ii, 1217.
3. October, 1957. Published quarterly by the Canadian Medical Association, 150, St. George Street, Toronto 5, Ontario. $10 per annum.
4. Published quarterly by Verlag Wilhelm Maudrich, Vienna 1, Franz-Josefs Kai 23. DM 55 per annum; DM 15 per copy.
5. Spastics in Cheyne Walk. Editors: JOAN SAUNDERS and MARJORIE NAPIER. London: Pitman Medical Publishing Co. 1957. Pp. 156. 20*s*.

if pregnancy or labour has been difficult, should be taken without delay to hospital or clinic for a full examination.

The editors are to be congratulated on capturing the essential aims of each member of the team and on showing how integration has been attained so that, since April, 1955, fifty families have been helped, with the hope that many more will be similarly helped in the future.

University of Cambridge

The late Lieut.-Colonel W. L. Harnett, F.R.C.S., has left about half his estate, subject to certain life-interests, to the university for "increasing medical knowledge and aiding medical research."

University of Liverpool

To mark the centenary of Sir Charles Sherrington's birth, Prof. K. J. Franklin will give an address on Tuesday, Nov.19, at 5 P.M., at the new medical school.

University of Manchester

An international congress on the Modern Educational Treatment of Deafness will be held at the University on July 15–23, 1958. It is being planned to bring together educators, doctors, audiologists, and educational psychologists, to consider and discuss the significance, to the future development of their work, of the results of modern research on problems of deafness in childhood.

Arrangements are being made to offer accommodation to members of the congress in university halls of residence. The cost of this type of accommodation is expected to be about 22*s*. a day, including bed, breakfast, and dinner. Forms of application for membership of the congress will be supplied by Prof. A. W. G. Ewing, Department of Education of the Deaf, The University, Manchester 13.

University of Aberdeen

On Oct. 30 the degree of M.D. with honours was conferred on W. M. Davidson, and with commendation on John McKenzie.

Royal College of Surgeons of England

Sir Simon Marks has given the college £75,000 so that they may complete the next section of their new building, which will house research laboratories and lecture-rooms. Sir Simon has also increased the annual contribution which he is making to the college for the next seven years to £10,000. In addition, Marks and Spencer, Ltd., have covenanted to give £10,000 a year for seven years, which can be used as the college decides for building or maintenance. Sir Simon has also indicated that the college may expect further help from members of his family as the building progresses.

Royal College of Obstetricians and Gynæcologists

On Nov. 5 the honorary fellowship of the college was conferred on Dr. I. C. Rubin, of New York.

Wellcome Trust

The Wellcome trustees have announced that, during the half-year ended Sept. 30, they made capital grants to the following institutions:

The Medical Research Council—Up to £26,000 for the construction and shipment to the Gambia of a twin-engined motor cruiser which will be used partly as a floating research laboratory, and partly to assist communication between the council's research laboratories at Fajara and the field-station near the village of Keneba, some 70 miles up the river.

St. Mary's Hospital Medical School, London.—Up to £70,000 for the cost of including a research floor with animal accommodation in the new wing of the school.

University of Glasgow.—Up to £50,000 for the cost of building a small-animals experimental research unit near the Veterinary Hospital at Garscube. The unit will provide facilities to further research programmes in the departments of the medical faculty and will offer opportunity for cooperative research by the departments of human and veterinary surgery. The work will be coordinated by a research committee including the professors of these subjects. Prof. W. L. Weipers will have responsibility for general administration.

St. Thomas' Hospital Medical School, London.—Up to £4000 for the cost of extending the accommodation for research on the treatment of cancer by radiotherapy in high-pressure oxygen.

University College, Cork.—Up to £2000 for the cost of extending the research accommodation in the department of anatomy.

Electron microscopes on loan.—Up to £47,500 to buy four electron microscopes, which will be placed on indefinite loan with the London Hospital Medical College, the University of Birmingham School of Medicine, St. Bartholomew's Hospital Medical College, and the University of Edinburgh Faculty of Medicine.

Anglo-American Physiological Expedition to Antarctica.—The trustees have agreed to provide, through the Medical Research Council, a contribution of £2300 towards the cost of equipping and maintaining in the coming winter, the British component of this expedition, which will carry out studies on human acclimatisation to cold.

Royal College of Physicians of London

At a comitia on Oct 31, with Dr. Robert Platt, the president, in the chair, Dr. W. P. H. Sheldon, Dr. R. E. Tunbridge, Dr. W. N. Mann, and Dr. J. S. Richardson were elected councillors. Sir Harold Boldero was re-elected representative on the Committee of Management. Dr. Platt, Sir Harold Boldero, Sir Allen Daley, Dr. R. R. Bomford, and Dr. S. R. F. Whittaker were elected members of the standing joint committee of the three Royal Colleges. It was announced that Dr. A. R. Southwood had been appointed Milroy lecturer for 1959, and that his subject would be cardiovascular diseases.

The Jenks scholarship was awarded to Peter John Richardson, late of Epsom College.

The following were admitted to the membership:

Simcha Bank, M.B. Cape Town, R. G. Bannister, B.M. Oxon., C. F. Brockington, M.D. Cantab., J. J. Brown, M.B. Lond., T. M. Dauncey, M.B. Birm., C. J. Edmonds, M.B. Lond., B. J. Fairhurst, M.B. Lpool, Margaret L. Gladstone, M.B. Leeds, M. R. P. Hall, B.M. Oxon., E. B. D. Hamilton, M.B. Cantab., Molly Hill, M.B. Birm., C. K. Hudson, M.B. Lond., E. E. F. Keal, M.B. Lond., Gillian A. J. Lomax, M.B. Lond., J. B. McGuinness, M.B. Glasg., John Richmond, M.B. Edin., N. R. Rowell, M.B. Durh., D. M. Shaw, M.B. Lond., A. B. Shearer, M.B. Queensland, Peter Sleight, M.B. Cantab., G. R. Sparrow, M.B. Melb., D. A. H. Yates, M.B. Lond.

Licences to practise were conferred upon the following 117 candidates who have passed the final examination of the Conjoint Board:

R. B. Alade, Diana P. Almond, Gonzalo Alvarez, Gregory Andem, R. P. Ashfield, A. W. Asscher, L. K. Barker, D. McW. Barlow, P. H. Beighton, Basil Bennett, Huw Bevan-Jones, H. B. Blackstone, Barbara J. Boucher, L. G. S. Bourdet, H. P. H. Bower, A. B. Browne, Isobel J. T. Bryant, Peter Bunton, A. C. Carter, L. J. Chalstrey, Anne E. Clark, Jennifer A. Clarke, R. E. Clayton-Jones, G. F. Cockings, R. R. Cox, Malcolm Deane, R. C. Dobbie, P. M. E. Drury, J. L. Edmondson, P. W. Edwards, Brian Elliott, Gillian W. Evans, J. S. Evans, Kevin Flintan, P. R. Francis, E. A. French, Lionel Fry, P. J. Fryer, Freda H. Garnett, R. J. Givans, D. T. Goradia, D. V. Gordon, M. E. J. Hackett, Dorothy L. Hall, Gillian C. Hanson, N. A. Harker, P. G. Hoare, N. E. S. Holden, R. M. Holman, Dorothy Horsfield, M. B. A. Jackson, D. M. Jenkins, A. W. Jowett, Menigha Kemmer, J. G. Lancaster, J. R. Lang, G. V. Lewis, Kathleen M. Lindesay, Nicholas Lis, J. P. Lissenden, J. O. Lloyd Jones, A. D. MacAdam, Millicent T. B. McGibbon, Terence McGovern, Margaret M. McKerrow, M. J. Mann, P. M. S. Margand, Josephine Maybanks, T. F. Meen, E. A. Mgbojikwe, J. I. Millar, W. H. Morton, R. S. Nicholl, T. J. Nokes, Sean O'Connell, P. T. Oke, Simeon Ovis, D. R. Owen, A. F. Parker, W. B. Peeling, Joan M. Penketh, B. C. B. Pickles, J. S. Povey, Hilary D. R. Rendle, J. B. Reynolds, Shirley J. Richards, P. C. Richardson, A. R. Robertson, M. R. G. Robinson, N. F. Russell, W. J. W. Siddall, G. C. Smith. Shirley P. Smith, R. P. Snaith, Jennifer J. Spurr, I. C. Sutherland, Aleksander Talerman, J. H. Taylor, R. S. Taylor, E. M. Thomas, Marlene J. Thrussell, R. J. Tolson, O. J. Vanderpuye, Paula R. Vanstone, Jayamanee Venkatasamy, Elizabeth A. Vyle, Anne Y. M. Wadlow, P. J. Waight, Keith Walker, G. D. P. Wallen, John Weston, Ingeborg E. I. Williams, R. T. Williams, Maureen M. Winter, Barbara E. Wood, Audrey J. N. Woolf, F. C. Worlock.

Postgraduate diplomas were conferred on those named in the report of the Royal College of Surgeons in our issue of Oct. 19 (p. 809) and on the following:

D.I.H.—J. P. Crowdy.

D.M.R.T.—J. E. Bennett, A. L. Brown, S. N. Chatterjee, Luis Delclos, Francis Kelly, Lois M. Myers, N. K. Neogy, P. J. O'Kelly, Mary G. Paine, M. A. Qureshi, A. G. Resnekov, E. R. Watson.

On Tuesday, Dec. 10, and Thursday, Dec. 12, at 5 P.M. at the college, Pall Mall East, S.W.1, Dr. Terence East will give the FitzPatrick lectures. His subject will be Some Aspects of the History of Cardiology.

Harveian Society of London

The council has selected the Clinical Significance of Tiredness as the subject for the Buckston Browne prize essay for 1958. Further particulars may be had from the hon. secretaries of the society, 11, Chandos Street, W.1.

Association of Clinical Biochemists

The following officers have been elected: president, Prof. E. J. King; chairman, Dr. R. Gaddie; hon. secretary, Dr. J. H. Wilkinson; hon. secretary, Dr. A. L. Tárnoky (Royal Berkshire Hospital, Reading).

Anglo-French Exchange Bursaries

Applications are invited for bursaries to be awarded in 1958 to young British doctors under the exchange scheme arranged by the French Embassy in London between the Institut National d'Hygiène in Paris and the Ciba Foundation in London. The grants (60,000 francs a month) will be awarded for two to four months to medical men who wish to obtain clinical experience or carry out research in France. Application forms may be had from Dr. G. E. W. Wolstenholme, director of the Foundation, 41, Portland Place, London, W.1. The closing date for applications is Feb. 2, 1958.

Royal Society of Medicine

The portrait of the late Sir William Gilliatt, commissioned by fellows of this society and painted by Mr. Edward Halliday, P.R.B.A., will be unveiled at 6 P.M. on Friday, Nov. 22, at 1, Wimpole Street, London, W.1.

Congress on Diseases of the Chest

The fifth international congress on diseases of the chest, sponsored by the American College of Chest Physicians, will be held in Tokyo, Japan, from Sept. 7 to 11, 1958. Further particulars may be had from the secretary of the congress, Dr. Jo Ono, School of Medicine, Keio University, 35, Shinanomachi, Shinjuku, Tokyo, Japan.

Fulbright Travel Grants

Travel grants will again be available next year to citizens of the United Kingdom to go to the United States of America for academic or educational purposes. Full particulars may be had from the United States Educational Commission in the United Kingdom, 71, South Audley Street, London, W.1.

International Goitre Conference

This conference will take place in London from July 5 to 9, 1960. Further particulars may be had from Mr. Selwyn Taylor, 3, Roedean Crescent, London, S.W.15, or Dr. John C. McClintock, 149½, Washington Avenue, Albany 10, New York, U.S.A.

World Medical Association

A British Supporting Group for the World Medical Association has been established, for the purpose of encouraging a wider knowledge of the work and potentialities of the W.M.A. Copies of the constitution and forms of application for individual or corporate membership may be had from the secretary of the steering committee of the Group, at B.M.A. House, Tavistock Square, London, W.C.1.

Social Security Agreement with Israel

A reciprocal agreement on social security between the United Kingdom and Israel came into force on Nov. 1. The agreement covers cash benefits provided by the two countries for old age, widowhood, orphanhood, maternity, and industrial injury. Further information may be had from the Ministry of Pensions and National Insurance, Overseas Group, Newcastle upon Tyne.

Whitley Agreement Turned Down

On Nov. 1 the Minister of Health and the Secretary of State for Scotland turned down part of a Whitley Council provisional agreement to increases in the salaries of the administrative and clinical staff of the National Health Service.

On Oct. 11 the Whitley Council had agreed that salaries over £1200 a year were to be increased by 5%, and salaries under that figure, which had already been raised by 3% by an industrial court award last December, by a further 3%. These two groups of employees had originally put forward claims for 8% and 5% respectively but had accepted the lower figures which were offered by the official side of the Whitley Council on which the Ministry is represented.

The Ministers accepted the proposed increase for salaries over £1200 but felt obliged, though with regret, to withhold approval from the increase for officers on salaries up to £1200. The Ministers added that they would be prepared to reconsider the question "after an interval of time in the light of the economic situation and any other relevant considerations."

Speaking at a meeting at Hoddesdon, Herts, Mr. Derek Walker-Smith said that Whitley Council agreements required the express approval of the Minister of Health because "any increases have to be met by the taxpayer. The Ministry of Health representatives are in a minority on the management side of this particular Whitley Council, and so the normal principle of collective bargaining does not apply, that those who agree to a wage increase have to find the money. The only ultimate safeguard of the public purse in cases such as this is the power of disapproval."

Fifty-five organisations with members in the National Health Service, including the British Medical Association and the Royal College of Nursing, have been invited to send representatives to a meeting, called for Nov. 13, to discuss joint action to persuade the Minister to withdrawn his veto. The staff and the management side of the Whitley Council were meeting on Nov. 6.

British Occupational Hygiene Society

Prof. T. F. Hatch, of Pittsburgh University, is to give a lecture to this society at the London School of Hygiene, Keppel Street, W.C.1, at 5.15 P.M. on Monday, Nov. 18. He is to speak on Human Engineering. Visitors will be welcome.

British Medical Students' Association

The annual general meeting of this association will be held at the Maternity Hospital, Glossop Terrace, Cardiff, from Nov. 15 to 17. It will be opened by Sir Tudor Thomas, the honorary president-elect.

London Amateur Boxing Association

Medical advisory panel.—A meeting of this panel will be held on Wednesday, Nov. 13, at the Great Northern Hotel, King's Cross, N.W.1, at 8 P.M., when Mr. Maxwell Ellis will speak on scalp and face wounds and their treatment. The meeting is open to all doctors.

Prize for Medical Films

The annual prize for medico-surgical films of 100,000 francs, awarded by the *Presse Médicale*, will be awarded in March, 1958. Films (11 mm. size only) should be submitted to the secretariat of the journal, 120, Boulevard Saint Germain, Paris VI^{e}, before Feb. 15, 1958.

Distressed Gentlefolk's Aid Association

Speaking at the annual general meeting on Oct. 24, Dr. C. A. Boucher, a senior medical officer of the Ministry of Health, said that the policy of this association, like that of the Ministry, was to encourage and help old people to continue to live in their own homes. But, for the minority who could not maintain their independence, residential accommodation with nursing care was necessary. Too often it was assumed that the old person with a small private income was able to look after herself; but ill health, mental or physical, might affect any old person, whatever her circumstances, and the needs of gentlefolk were urgent though they were not always recognised. In its homes the association provided well-qualified staff and gave security to the residents. The building of the association's new home in Vicarage Gate, London, for 42 nursing cases and 7 ambulant cases in single, double, and multiple rooms would be, he said, "a magnificent contribution to this immense problem."

Old Epsomian Club

Presiding at the annual dinner on Oct. 31, Mr. Ernest Taylor said that £36,000 has so far been contributed to the appeal for Epsom College, and with recovery of income tax on seven-year covenants this should produce about £60,000. Some building could now be put in hand; but the school needed at least £250,000, and he earnestly hoped that all Epsomians, as well as others, would consider what they could do. The school was originally founded for doctors' sons, and even today two-thirds of the boarders had medical fathers. Mr. H. W. F. Franklin, the headmaster, referred to the Medical Insurance Agency's recent endowment of scholarships of £250 a year for "the more intellectual" sons of doctors. These have been named after Dr. Henry Robinson (see *Lancet*, Oct. 5, 1957, p. 702).

Mr. Derek Walker-Smith, Minister of Health, proposing *Floreat Epsomia*, said that the study of medicine was not only absorbing but also one of the best educational processes; and he saluted doctors for the fine use they made of their opportunities. It would be pleasant if we could go ahead with health and education regardless of cost, but we had to take account, in all these fields, of efficiency and economy. Dr. J. F. Lockwood, vice-chancellor of the University of London, said that but for Epsom there would be no faculty of medicine in his university. His reply for The Guests was full of aphorisms and maxims (Nowadays to be intelligible is to be found out; Don't let your school work interfere with your education); and in a tribute to the Headmaster he quoted the saying that, whereas it is hard to become a professor and easy to be one, it is easy to become head of a college but hard to be one. To Mr. Franklin being head of a college came easy.

Lord Grantchester, proposing The President, defined manners as "the happy way of doing things"; and Mr. Taylor, in his reply, asked again for further help with the school's appeal. Particulars of this may be had from the appeals secretary, Epsom College, Epsom, Surrey.

Conference on the Backward Child

The Guild of Diploma Teachers of Backward Children are to hold a conference on April 18 and 19 at Goldsmiths' College, S.E.14. Further particulars may be had from Mr. S. S. Segal, 10, Fielding House, Boundary Road, St. John's Wood, London, N.W.8.

International Federation of Gynæcology and Obstetrics

The congress of this federation will be held in Montreal from June 22 to 28, 1958. Further particulars may be had from the secretariat of the federation, Suite 220, 1414, Drummond Street, Montreal 25, Canada.

New Insurance Benefit

From Nov. 18 a new insurance benefit will be available to a woman with a child or children whose marriage has been dissolved or annulled. This benefit, to be called "child's special allowance," is payable where her former husband has died if she has a child towards whose support he was contributing. Title to the benefit will depend on his insurance record.

The allowance is a weekly payment equal to the amount her former husband was paying before his death towards the child's support, but not exceeding 16*s.* 6*d.* a week for the first or only child and 8*s.* 6*d.* for each other child (for whom family allowances may also be paid). The benefit will not be payable unless he was contributing at least 5*s.* a week and it cannot be paid where he died before July 5, 1948. The Ministry has no means of identifying the mothers who may be eligible for the new benefit. Application should, therefore, be made to the local Pensions and National Insurance Office as soon as possible after Nov. 1.

The Privy Council have appointed Dr. Andrew Wilson, professor of pharmacology in the University of Liverpool, "to be a person to be present at the examinations held by the Pharmaceutical Society of Great Britain."

CORRIGENDUM: *A New Look for Proctology.*—Footnote 10 of this leader (Oct. 26, p. 837) should read Parks, A. G. *Brit. J. Surg.* 1956, **43**, 337.

Diary of the Week

Monday, 11th

POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12
4 P.M. Prof. Alan Kekwick: Obesity.

Tuesday, 12th

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1
5 P.M. Dr. Ronald Bodley Scott: The Chemotherapy of Malignant Disease. (Langdon-Brown lecture.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Psychiatry.* Dr. Brian Ackner, Dr. Guiseppe Pampiglione, Dr. Peter Sainsbury: Physiological Measurements of Emotional Tension.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Dr. D. L. Mollin: Megaloblastic Anæmias.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, W.2
5 P.M. Mr. C. W. F. Burnett: Postpartum Collapse.

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. E. J. Moynahan: Hair Growth.

WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY, 91, Dean Street, W.1
5.30 P.M. Mr. Joseph Minton: Ocular Manifestations in Clinical Neurology (second of two lectures).

CHELSEA CLINICAL SOCIETY
8.30 P.M. (Rembrandt Hotel, Thurloe Place, S.W.7.) Lieut.-Colonel E. L. O. Hood: The Doctor and Nuclear Warfare.

ROYAL ARMY MEDICAL COLLEGE, Millbank, S.W.1
5 P.M. Prof. C. G. Rob: Surgical Treatment of Atherosclerosis.

MANCHESTER MEDICAL SOCIETY
4.30 P.M. (Medical School, University of Manchester.) Prof. Fraser Brockington: Epidemiologists of the Privy Council, 1858–1870.
8 P.M. (Clinical Sciences Building, York Place, Manchester, 13.) *Surgery.* Mr. K. V. Bailey: Stress Incontinence With Uterine Prolapse. (Part 2.)

Wednesday, 13th

UNIVERSITY OF LONDON
5.15 P.M. (London School of Hygiene and Tropical Medicine.) Prof. T. F. Hatch (Pittsburgh): Environmental Stress and Man's Health.

ROYAL SOCIETY OF MEDICINE
4.30 P.M. *Physical Medicine.* Dr. Ronald Harris: Hydrotherapy—Is it of Value?
8 P.M. *Proctology.* Mr. Henry Thompson: Polyposis Intestini. (Presidential address.)

POSTGRADUATE MEDICAL SCHOOL
2 P.M. Dr. E. Lester Smith: Biochemistry of Vitamin B_{12}.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. J. A. Dudgeon: Virus Diseases.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. F. H. Scadding: Delayed Resolution in Pneumonia.

INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, W.C.1
5.30 P.M. Dr. Michael Kremer: Metabolic and Toxic Disorders.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
4 P.M. Mr. Harold Dodd: Varicose Veins and Ulcers of the Leg.

NOTTINGHAM MEDICO-CHIRURGICAL SOCIETY, 64, St. James's Street, Nottingham
8.30 P.M. Mr. C. Keith Vartan: Management of Hypertension and Pre-eclampsia in Pregnancy.

MANCHESTER MEDICAL SOCIETY
4.30 P.M. *Pathology.* (University of Manchester.) Dr. Leon Golberg, Dr. J. P. Smith: Iron—Food for Thought.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street, Glasgow
5 P.M. Dr. E. F. Scowen: Endocrine Influences on Breast Cancer. (Finlayson lecture.)

Thursday, 14th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Sir Cecil Wakeley: Surgeons and the Navy. (Thomas Vicary lecture.)

ROYAL SOCIETY OF MEDICINE
5 P.M. *Ophthalmology.* Prof. Brodie Hughes, Mr. J. E. M. Ayoub, Mr. J. V. Smith: Visual Fields and Methods of Field Taking.

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Dr. H. O. Schild: Mechanism of Anaphylaxis.

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
3 P.M. (Hammersmith Hospital, W.12.) Dr. T. N. MacGregor: Endocrine Problems in Gynæcology.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION
2 P.M. (1, Wimpole Street, W.1.) Sir Wilfrid Le Gros Clark: Sensory Experience and Brain Structure. (Maudsley lecture.)

NUFFIELD ORTHOPÆDIC CENTRE, Wingfield-Morris Orthopædic Hospital, Oxford
8.30 P.M. Prof. A. K. Saha (Calcutta): Flail Hip—Its Treatment by Abdominal Muscle Transfer.

LIVERPOOL MEDICAL INSTITUTION, 114, Mount Pleasant, Liverpool, 3
8 P.M. Prof. T. N. A. Jeffcoate: Cancer Research. (Florence Blair-Bell lecture.)

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, 9, Queen Street, Edinburgh 2
5 P.M. Sir Russell Brain: Neurology—Past, Present and Future. (Frederick Price lecture.)

HONYMAN GILLESPIE LECTURE
5 P.M. (University New Buildings, Teviot Place, Edinburgh.) Dr. J. B. Stanton: Recent Approaches to Disorders of Speech and Language.

UNIVERSITY OF ST. ANDREWS
5 P.M. (Queen's College, Dundee.) Prof. J. R. Squire: Effects of Cortisone, Diet, and Penicillin in Adults with the Nephrotic Syndrome.

Friday, 15th

ROYAL SOCIETY OF MEDICINE
5 P.M. *Epidemiology and Preventive Medicine.* Dr Alison McDonald, Dr. R. G. Record, Dr. J. A. McCredie Smith: Events in Pregnancy in Relation to Disease and Defects in the Infant.
8.15 P.M. *Radiology.* Dr. G. E. Donovan, Mr. E. Stafford: Vision, Photography, and Electronics in Radiography.

POSTGRADUATE MEDICAL SCHOOL
10 A.M. Prof. Brodie Hughes: Indirect Injuries of the Optic Nerves and Chiasma.
4 P.M. Dr. W. I. Card: Gastro-Secretory Function.

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
4.30 P.M. (Chelsea Hospital for Women, S.W.3.) Mr. Percy Malpas: Utero-Vaginal Prolapse and its Treatment.

BRITISH SOCIETY FOR IMMUNOLOGY
10 A.M. (183, Euston Road, N.W.1.) Symposium in Immuno-hæmatology. (Opening of two-day meeting.)

ROYAL MEDICO-CHIRURGICAL SOCIETY OF GLASGOW
8.30 P.M. (Royal Faculty of Physicians and Surgeons of Glasgow.) Prof. W. C. W. Nixon: Use and Abuse of Oxytocic Drugs in Obstetrics and Gynæcology.

Saturday, 16th

COLLEGE OF GENERAL PRACTITIONERS
11.30 A.M. (B.M.A. House, Tavistock Square, W.C.1.) Dr. D. M. Hughes: Twenty-five Years in Country Practice. (James Mackenzie lecture.)

Appointments

BOLAND, J. W., M.B. Dubl., F.R.C.S.E., F.F.R., D.M.R.T.: consultant radiotherapist, Christie Hospital and Holt Radium Institute, Manchester.

GALL, W. J., M.B. Brist., F.R.C.S.: senior surgical registrar, South Western Regional Hospital Board and United Bristol Hospitals.

GROSSMANN, MARIA E., M.D. Prague, M.R.C.S., D.M.R.E.: consultant radiologist, dental department, University College Hospital, London.

HELME, V. P., M.B. Lpool, D.OBST.: assistant M.O., Herefordshire.

HEWET, JOHN, M.B. Manc., F.R.C.S.: consultant general surgeon, Stockport and Buxton group of hospitals.

LAWSON, C. W., M.D. Sheff., M.R.C.P.: consultant physician, Leicester isolation hospital and chest unit.

MAWDSLEY, EVE M., M.B. Manc., D.C.H.: assistant M.O.H. and school M.O., Bolton.

MYERSCOUGH, M.B. Edin., F.R.C.S.E., M.R.C.O.G.: obstetrician and gynæcologist, Royal Infirmary, Simpson Memorial Maternity Pavilion, and Eastern General Hospital, Edinburgh.

PEARSON, M. G., M.B. Edin., F.R.C.S.E., M.R.C.O.G.: obstetrician and gynæcologist, Royal Infirmary, Simpson Memorial Maternity Pavilion, Chalmers Hospital Annexe, Western General Hospital, Edinburgh, and hospitals in Hawick.

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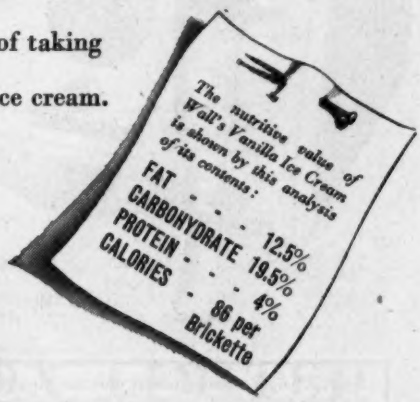
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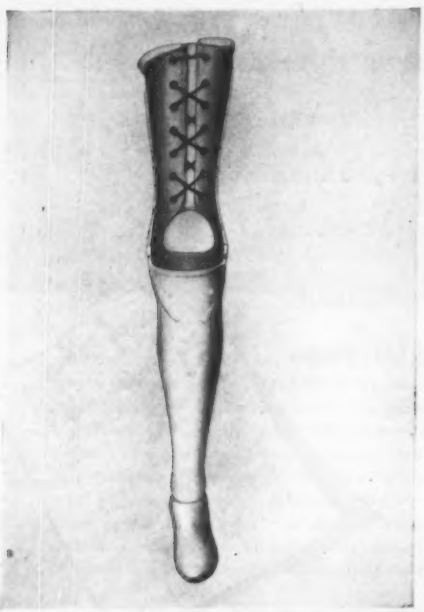

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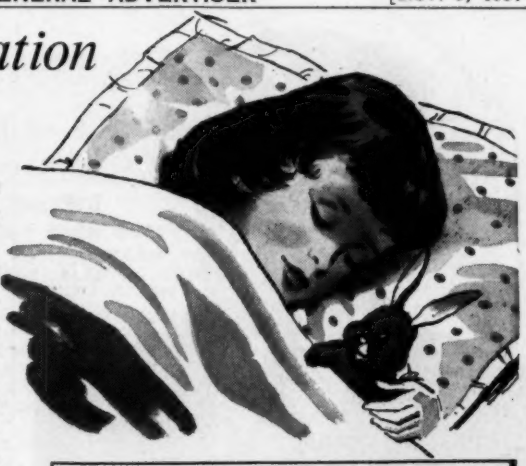

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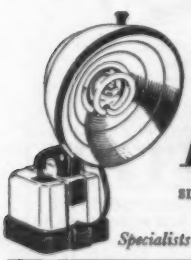

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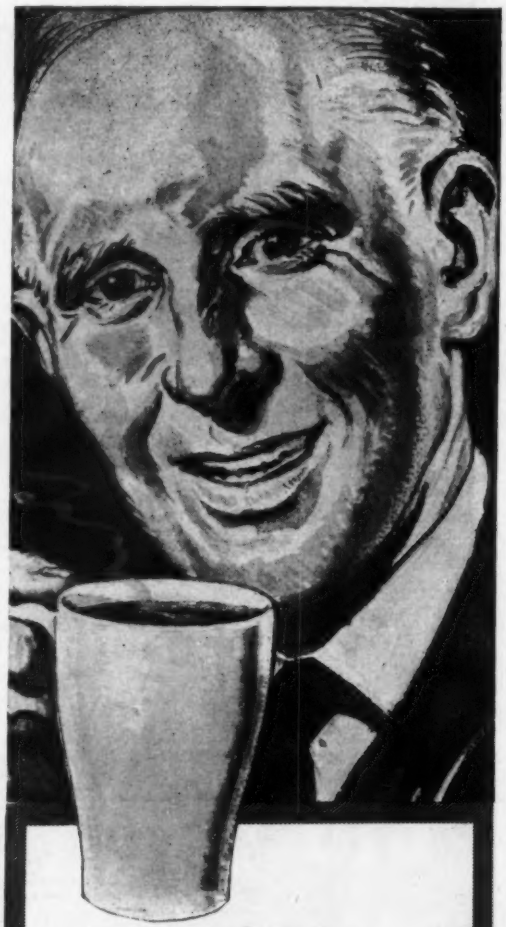

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Academic and Educational

ROYAL COLLEGE OF PHYSICIANS

LEVERHULME RESEARCH SCHOLAR

Applications are invited for a Leverhulme Research Scholarship value of £1000 a year. The Scholarship will be for 1 year in the first instance, and may be renewed for a maximum of 3 years. A scholar must satisfy the College that the major part of his time is spent on his research, but he may be allowed to hold another appointment. Scholars must devote themselves to the investigation of some problem related to disease as it occurs in man, in any branch of medicine. The work must be done in some established institution, preferably in the United Kingdom, in which full facilities for the research are available.

Applications, accompanied by the names of 2 referees, should state details of the proposed work, the name of the individual under whom it is proposed to work and the Institution where the work is to be done. Application forms may be obtained from the Assistant Registrar, Royal College of Physicians, Pall Mall East, London, S.W.1. Applications for the Scholarship must be received not later than 20th January, 1958.

FACULTY OF RADIOLOGISTS
47, Lincoln's Inn Fields, London, W.C.2

The CROOKSHANK LECTURE will be delivered at the Royal College of Surgeons, London, on FRIDAY, 15TH NOVEMBER at 5 P.M. by Prof. LEO RIGLER, M.D.

His subject will be "Roentgen studies on the evolution of carcinoma of the lung."

The Lecture is open to all members of the medical profession. Tea will be served from 4.30 p.m.

PADDINGTON GROUP HOSPITAL MANAGEMENT COMMITTEE
(THE TAVISTOCK CLINIC)

DISCUSSION GROUP SEMINAR ON PSYCHOLOGICAL PROBLEMS IN SPECIALIST AND HOSPITAL PRACTICE

It is planned to start a COURSE of 8 to 10 discussion meetings for a limited number of consultants and other senior medical hospital staff. Meetings will be held on TUESDAYS 7.30–9.30 P.M. Admission free.

Apply in writing for further particulars to Medical Director, Tavistock Clinic, 2, Beaumont-street, W.1, stating possible times for attending.

NAPT SYMPOSIUM MEETINGS

LUNG CARCINOMA. Chairman: N. LLOYD RUSBY, M.A., D.M., F.R.C.P. FRIDAY, 22ND NOVEMBER.

CARDIAC PROBLEMS FOR GENERAL PHYSICIANS. Chairman: K. SHIRLEY SMITH, B.SC., M.D., F.R.C.P. FRIDAY, 6TH DECEMBER.

Both meetings 3.30–6.30 P.M. in Great Hall, B.M.A. House, W.C.1. Tickets, including afternoon tea and sherry, 10s. each.

Details from NAPT, Tavistock House North, W.C.1.

NAPT

SYMPOSIUM ON CHRONIC BRONCHITIS, Edinburgh. WEDNESDAY, 20TH NOVEMBER, 3.30–6.30 P.M. Adam House.

Details from NAPT, 65, Castle-street, Edinburgh.

Tickets, including afternoon tea and sherry, 10 shillings each.

NAPT

A SCHOLARSHIP of £350 is offered to enable a British Chest Physician to study tuberculosis and other chest diseases in Canada for three months.

Applications to the Secretary-General, NAPT, Tavistock House North, Tavistock-square, London, W.C.1. Closing date 31st December, 1957.

THE NUFFIELD FOUNDATION

MEDICAL FELLOWSHIPS

As part of its programme for the advancement of health, the Nuffield Foundation is prepared to award a number of Fellowships to highly qualified men and women of the United Kingdom, usually between the ages of 25 and 35, who wish to train further for teaching and research appointments in any branch of medicine.

Applications for awards in 1958, which must first be endorsed by the executive authority of a university medical school in the United Kingdom, must be received by the Foundation not later than 1st February, 1958.

The conditions of these Fellowships and the application forms are obtainable from the Director, The Nuffield Foundation, Nuffield Lodge, Regent's Park, London, N.W.1.

L. FARRER-BROWN, Director of the Nuffield Foundation.

AMENDED DATES
L.M.S.S.A.

FINAL EXAMINATION: MEDICINE, 9th December, 1957, 13th January, 10th February, 1958. SURGERY, 9th December, 1957, 13th January, 10th February, 1958. MIDWIFERY, 10th December, 1957, 14th January, 11th February, 1958. PATHOLOGY, 10th December, 1957, 14th January, 11th February, 1958. MASTERY OF MIDWIFERY, May and November. DIPLOMA IN INDUSTRIAL HEALTH, July and December.

For regulations apply REGISTRAR, Apothecaries Hall, Black Friars-lane, London, E.C.4.

POSTGRADUATE MEDICAL SCHOOL OF LONDON. Applications are invited for the post of LECTURER IN MEDICINE (neurology), which is vacant from 1st April, 1958. The appointee will have Consultant status in Hammersmith Hospital and the Postgraduate Medical School, and he will also have status and facilities in the Academic Unit in the Institute of Neurology, Queen's-square. Salary range £2050–£100–£2550.

Applications (7 copies), with the names of 3 referees, should be received not later than 1st December, 1957, by the Dean, Postgraduate Medical School, Ducane-road, W.12.

GLASGOW POST-GRADUATE MEDICAL EDUCATION COMMITTEE

COURSE IN PSYCHOLOGICAL MEDICINE

A 2 term part-time Course has been organised to run during the Candlemas (6TH JANUARY–15TH MARCH) and Whitsun (15TH APRIL–21ST JUNE) terms, 1958. The Course is designed to supply formal training for graduates who intend to specialise in psychiatry, but is open to all registered medical practitioners. The instruction will amount to 10 hours per week given on MONDAY, TUESDAY and THURSDAY afternoons and SATURDAY mornings. During the Candlemas term, instruction will be provided in disciplines basic to psychiatry. During the Whitsun term, instruction will be on clinical subjects and students will attend various psychiatric hospitals. The fee for the Course is £35.

For further details, application should be made to the Director of Post-Graduate Medical Education, The University, Glasgow, W.2.

THE MEDICAL UNIT, ST. BARTHOLOMEW'S HOSPITAL MEDICAL COLLEGE, London, E.C.1. Applications are invited for the post of RESEARCH ASSISTANT, tenable as from 1st December, 1957, or as soon after as possible, to work on problems of intermediary metabolism in man. The work is entirely chemical and previous experience in a research department would be an advantage. Minimum qualifications B.Sc. (special chemistry) or B.Sc. (general) with chemistry as one subject. Salary on the scale £525–£50–£575–£50–£625. The commencing point on the scale will depend upon qualifications and experience.

Applications, in writing, to the Secretary of the Medical College.

UNIVERSITY OF OXFORD. Applications are invited for the post of Whole-time FIRST ASSISTANT in the Nuffield Department of Anæsthetics, duties to commence early 1958. A particular interest in analgesia and anæsthesia in Obstetrics is desirable. The salary will be within the range £1900–£2500. The successful candidate will be granted an Honorary contract under the Board of Governors of the United Oxford Hospitals.

Applications (2 copies), together with the names of 3 referees, should be received not later than the end of November, 1957, by the Administrator, Radcliffe Infirmary, Oxford.

UNIVERSITY OF ST. ANDREWS. Queen's College, DUNDEE. DEPARTMENT OF BACTERIOLOGY. Applications are invited for an ASSISTANTSHIP in the Department of Bacteriology, Queen's College, Dundee. Salary scales medically qualified, £900–£100–£1100; non-medically qualified, £750–£50–£850; tenure for 3 years, renewable, under special circumstances, for a fourth and final year. F.S.S.U. and family allowance benefits; a grant towards removal expenses may be made.

Applications (6 copies), containing the names of 3 referees, to be lodged with the undersigned not later than 30th November, 1957.

PATRICK CUMMING, Joint Clerk to the University Court.

UNIVERSITY OF DUBLIN. Trinity College. Applications are invited for whole-time positions as JUNIOR PATHOLOGISTS. The salary will be in the range £570–£47 10s.–£855 p.a. The officers will participate in a non-contributory insurance pension scheme.

Further information may be obtained from the Registrar, Trinity College, Dublin, who will receive applications until 7th December, 1957.

UNIVERSITY OF DUBLIN. Trinity College. Applications are invited for a whole-time position as medically qualified LECTURER IN BACTERIOLOGY, to work in the Medical School and the associated Hospitals. The salary will be in the range £760–£47 10s.–£1140 p.a. The Lecturer will participate in a non-contributory insurance pension scheme.

Further information may be obtained from the Registrar, Trinity College, Dublin, who will receive applications until 7th December, 1957.

UNIVERSITY OF DUBLIN. Trinity College. Applications are invited for a whole-time position as LECTURER IN PATHOLOGY, to work in the medical school and the associated hospitals. The salary will be in the range £1235–£95–£1995 p.a. The lecturer will participate in a non-contributory insurance pension scheme.

Further information may be obtained from the Registrar, Trinity College, Dublin, who will receive applications until 7th December, 1957.

MAKERERE COLLEGE. The University College of East AFRICA. Applications are invited for LECTURESHIP IN PATHOLOGY. Salary scale £1446–£57–£1617–£60–£1737–£63–£1989 p.a., entry point determined by qualifications and experience. F.S.S.U. Child allowance £50 p.a. per child (maximum £150 p.a.). Passages for appointee and family (up to 4 adult passages) on appointment, termination and leave (3 months every 21 months). Rent according to quarters provided (£45–£84 p.a.) including basic furniture.

Detailed applications (6 copies), naming 3 referees, by 19th December, 1957, to Secretary, Inter-University Council for Higher Education Overseas, 29, Woburn-square, London, W.C.1, from whom further particulars may be obtained.

UNIVERSITY OF MALAYA, Singapore. Applications are invited, from candidates with registrable, medical qualification, for ASSISTANT LECTURESHIP IN PATHOLOGY. Salary scale £1148–£49–£1246 p.a.; entry point according to qualifications and experience. Allowances: expatriation in range £280–£308 p.a., cost of living in range £210–£560 p.a. All paid in Malayan currency. Passages for appointee, wife and children under 12 years. Part-furnished quarters at reasonable rent. Provident fund scheme.

Applications (6 copies), naming 3 referees and detailing qualifications and experience, by 30th November, 1957, to Secretary, Inter-University Council for Higher Education Overseas, 29, Woburn-square, London, W.C.1, from whom further particulars may be obtained.

Hospital Services: Senior Appointments

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. ADDENBROOKE'S HOSPITAL AND THE EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT OPHTHALMOLOGIST (part-time) to be appointed jointly by the 2 Boards for duties mainly at Addenbrooke's Hospital (5 sessions per week) but including also work at Regional Hospital Board hospitals (2 sessions per week). The terms and conditions of service for hospital medical staff will apply.

Applications (12 copies), stating age, qualifications and details of present and previous appointments, together with names of 3 referees, to Secretary, The United Cambridge Hospitals, Addenbrooke's Hospital, Cambridge, by 30th November.

KING'S COLLEGE HOSPITAL, Denmark-hill, S.E.5. Applications are invited for the post of Part-time CONSULTANT in Dermatology for 5 sessions per week, tenable from 1st August, 1958.

Applications (12 copies), giving details of age, qualifications and experience, and with the names of 3 referees, should be sent to the undersigned not later than 7th December, 1957.

S. W. BARNES, House Governor.

LEEDS REGIONAL HOSPITAL BOARD. Applications are invited from medical practitioners for the appointment of REGIONAL PSYCHIATRIST. The person appointed will be employed for 7/11ths of his time on administrative duties concerned with the development of the Mental Health Service in the Region and will be on the staff of the Senior Administrative Medical Officer at the Board's Headquarters, Harrogate. (Salary scale, whole-time, £2300–£2875 p.a.). For the remaining 4/11ths of his time he will be engaged on Consultant clinical work (salary scale, whole-time, £2205–£3255 p.a.). The proportion of time spent on administrative and clinical duties will be subject to review from time to time. It is hoped that arrangements will be made for the successful candidate to work in association with the Leeds University Department of Psychiatry for at least 1 session per week. Candidates should hold high qualifications in medicine and psychiatry and have wide experience in general psychiatry, including administrative experience of both inpatient and outpatient work.

Applications (12 copies), with full details of qualifications and experience, together with the names of 3 referees, to be sent to the Secretary, Park-parade, Harrogate, by 18th November, 1957.

MANCHESTER REGIONAL HOSPITAL BOARD. Part-time (8 half-days weekly) CONSULTANT E.N.T. SURGEON to the Stockport and Buxton Group of hospitals, mainly at Stockport Infirmary. Wide experience and higher qualifications essential; appointee to reside in or near to Stockport.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 25th November, 1957.

NEWCASTLE REGIONAL HOSPITAL BOARD. EAST CUMBERLAND GROUP OF HOSPITALS. Locum CONSULTANT SURGEON required immediately for period of 2 months.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, 72, Warwick-road, Carlisle.

NEWCASTLE REGIONAL HOSPITAL BOARD. Locum OPHTHALMOLOGIST (Senior Hospital Medical Officer status) for Sunderland and Hartlepools Groups of hospitals.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, immediately.

NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

1. CONSULTANT SURGEON, 7 half-days a week, Barnet General Hospital, Wellhouse-lane, Barnet (461 Beds). Successful candidates may be required to work also at other hospitals in the Barnet Group, and is required to live within easy reach of Barnet General Hospital, which may be visited by direct appointment.

Applications before 2nd December, 1957.

2. ASSISTANT CHILD PSYCHIATRIST, Senior Hospital Medical Officer grade, 6 half-days a week, Hertfordshire Child Guidance Service. Applications will be considered for 6, 4, or 2 half-days a week and candidates should state for which they are applying. Clinic may be visited by appointment with Medical Director, Child Guidance Clinic, Hill End, St. Albans.

Applications before 6th December, 1957.

Application forms obtainable from and returnable to Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for a whole-time post of SENIOR HOSPITAL MEDICAL OFFICER in Anesthetics at the Stornoway Hospitals. Duties are mainly at the Lewis Hospital, where a rented house is available for the officer.

Schedules of application and further particulars are obtainable from the undersigned, with whom applications should be lodged by 30th November, 1957.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer,
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

WELSH REGIONAL HOSPITAL BOARD. Whole-time ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer), to serve the Caernarvon and Anglesey Hospital Management Committee, based at Caernarvon and Anglesey General Hospital, Bangor, with visits to other hospitals in the group.

Applications (12 copies), naming 3 referees, to Senior Administrative Medical Officer), Temple of Peace, Cathays Park, Cardiff, within 21 days.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens ASSISTANT CHEST PHYSICIAN required Llanelly Chest Clinic immediately.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

AUSTRALIA. ROCKHAMPTON HOSPITAL, Queensland. Applications are invited for appointment as Part-time PHYSICIAN at the Rockhampton Base Hospital. 4 2-hour sessions per week. Salary at the rate of £907 p.a. Rockhampton has a population of 42,000 and is the centre of district of 90,000 population. Further particulars of the position and opportunity for private practice will be forwarded upon request.

Applications should be addressed to the Secretary, Rockhampton Hospitals Board, Rockhampton. Applications close on 31st December, 1957.

U.S.A., BROOKLYN, NEW YORK. Anesthesiologists. 2 openings on the Professional Staff of a 400-Bed Hospital, 20 minutes from Times Square. Active anesthesia experience in wide variety anesthesia techniques, including cardio-pulmonary. New operating room, air-conditioned suite. This Hospital affiliated with New York State University Medical School.

Applications, stating age, nationality, qualifications and previous experience. 2 references requested. Send applications to Director of Anesthesiology, Address No. 334, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Hospital Services: Junior Appointments

ALBERT DOCK ORTHOPÆDIC AND FRACTURE HOSPITAL, Alnwick-road, E.16. SENIOR HOUSE OFFICER (surgery) required on 21st November. Post, which is normally resident, is recognised by the Royal College of Surgeons, and provides excellent experience in a wide variety of traumatic conditions received from the adjacent dockland and from shipping in the Port of London. Salary £819 10s.

Applications, stating age, nationality, qualifications, and experience, with the names of 2 recent referees, should be sent to the Secretary, Dreadnought Seamen's Hospital, Greenwich, not later than 14th November.

ALL SAINTS' HOSPITAL (Westminster Hospital Teaching Group), Austral-street, West-square, London, S.E.11. Applications are invited for the post of SURGICAL REGISTRAR (urological) for 1 year in the first instance, from 1st January, 1958, subject to the usual terms and conditions of service of hospital medical and dental staffs. The post is primarily for the Urological Department, but some general surgery is also included; it offers time for postgraduate study and there is access to clinical material throughout the Group.

Applications (7 copies), with the names of 2 referees, should reach the Secretary at the above address not later than 23rd November, 1957.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER required in Gastroenterological Department. Appointment from 5th December, 1957. Pre-registration candidates only will be considered.

Applications, with 2 testimonials, to Medical Director by 16th November, 1957.

COLINDALE HOSPITAL, Colindale-avenue, London, N.W.9. (300 Beds.) SENIOR HOUSE OFFICER, resident or non-resident, required at above Hospital to assist in thoracic, orthopædic, and genito-urinary surgery.

Apply, stating age, qualifications and experience and giving the names and addresses of 2 referees, to Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, by 16th November, 1957.

DULWICH HOSPITAL, East Dulwich-grove, S.E.22. Applications invited for appointment as SENIOR HOUSE OFFICER (pathology). The hospital is associated with King's College Hospital Medical School for teaching purposes.

Applications, giving age and details of qualifications and previous posts, with names of 2 referees or copy testimonials, to Group Secretary, Camberwell Hospital Management Committee, Dulwich Hospital.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. ROYAL FREE HOSPITAL GROUP. Applications are invited from pre-registration and registered Women medical practitioners for the post of FIRST HOUSE PHYSICIAN for Medicine and Pediatrics, to become vacant 1st January, 1958. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 20th November, 1957.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. ROYAL FREE HOSPITAL GROUP. Applications are invited from pre-registration and registered Women medical practitioners for the post of SECOND HOUSE PHYSICIAN. Appointment for 6 months from 1st January, 1958. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 20th November, 1957.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. ROYAL FREE HOSPITAL GROUP. Applications are invited from pre-registration and registered Women medical practitioners for the post of FIRST HOUSE SURGEON, with charge of General Surgical Beds. Appointment for 6 months from 1st January, 1958. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 20th November, 1957.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. ROYAL FREE HOSPITAL GROUP. Applications are invited from pre-registration and registered Women medical practitioners for the post of SECOND HOUSE SURGEON. Appointment for 6 months, from 1st January, 1958. Salary according to Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 20th November, 1957.

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1. ROYAL FREE HOSPITAL GROUP. Applications are invited from pre-registration and registered women medical practitioners for the post of of OBSTETRIC HOUSE SURGEON (recognised for the M.R.C.O.G.). Duties to commence 1st January, 1958. Appointment for 6 months. Salary in accordance with Ministry of Health Scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to The Secretary, Elizabeth Garrett Anderson Hospital, by 20th November, 1957.

GUY'S HOSPITAL, S.E.1, and SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR in Clinical Pathology to the Board of Governors of Guy's Hospital and the South East Metropolitan Regional Hospital Board, with duties until 30th September, 1960. The appointment will be made jointly by the bodies concerned and will be held in the first instance in the Lewisham Group until 30th September, 1959, and at Guy's Hospital from 1st October, 1959, until 30th September, 1960. The post, which will be reviewed annually, is subject to the terms and conditions of service of hospital medical and dental staff (England and Wales).

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 16th November, 1957.

HACKNEY HOSPITAL, London, E.9 (General—841 Beds.)

(*a*) Pre-registration HOUSE PHYSICIAN, vacant 18th December.

(*b*) Registered HOUSE PHYSICIAN, vacant 1st December.

Applications for the above resident posts to Secretary at above address, by 18th November.

HAMMERSMITH HOSPITAL INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, Ducane-road, London, W.12. Whole-time, NON-RESIDENT SENIOR REGISTRAR (obstetrics and gynæcology) required. Post vacant 1st January.

Applications, stating age, qualifications, experience and names of 2 referees, to Secretary, The Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, London, W.12, by 18th November.

HAMMERSMITH HOSPITAL INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY, Ducane-road, London, W.12. Whole-time, NON-RESIDENT REGISTRAR (obstetrics and gynæcology) required.

Applications, stating age, qualifications and experience, names of 2 referees, to Secretary, The Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, London, W.12, by 18th November.

KING'S COLLEGE HOSPITAL, Denmark-hill, S.E.5. Applications are invited for the post of REGISTRAR in Physical Medicine for 1 year, tenable until 30th September, 1958, in the first instance, and to be filled as soon as possible. Applicants should preferably have had experience in general medicine and hold the M.D. or M.R.C.P.

Applications, together with the names of 2 referees, to be sent to the undersigned by 23rd November, 1957.

S. W. BARNES, House Governor.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR in general medicine becoming vacant on 20th January, 1958. A higher qualification, although desirable, is not essential.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 16th November, 1957. H. BRIERLEY, House Governor.

NEW END HOSPITAL, London, N.W.3. Applications are invited for the post of SENIOR HOUSE OFFICER (General Medicine) vacant 1st January, 1958.

Application forms obtainable from Group Secretary, 46, Cholmeley Park, N.6 (ARC. 3070, Ext. 527), and returnable to the Surgeon Superintendent, New End Hospital, by 18th November, 1957.

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.

ANÆSTHETIC REGISTRAR (non-resident), Prince of Wales's General Hospital, Tottenham, N.15, and other hospitals in the Tottenham Group. Recognised for D.A. and F.F.A. R.C.S.

MEDICAL REGISTRAR (resident), Rush Green Hospital, Romford, Essex.

REGISTRAR in Diseases of the Chest (resident), Rochford General Hospital and Lancaster House Chest Clinic, Southend-on-Sea, Essex. Experience in general medicine and special experience in diseases of the chest essential; for treatment of respiratory tuberculosis and other chest diseases.

SURGICAL REGISTRAR (resident) Herts and Essex General Hospital, Bishops Stortford, Herts. Recognised for F.R.C.S.

REGISTRAR in Obstetrics (resident), East End Maternity Hospital, Commercial-road, E.1. Recognised for M.R.C.O.G. in obstetrics only. Previous experience in obstetrics essential.

Appointments subject to review after 1 year.

Application forms from Secretary, 11A, Portland-place, W.1, to be returned by 23rd November.

PRINCESS BEATRICE HOSPITAL, Earls Court, London, S.W.5. Applications are invited from fully registered medical practitioners for the post of OBSTETRIC HOUSE SURGEON with gynæcology and some general surgery. Senior House Officer grade. Resident Vacancy mid-December.

Applications, with 3 testimonials, to the House-Governor, not later than 25th November, 1957.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT JUNIOR HOUSE SURGEON for Casualty (pre-registration first or second post) to the above Hospital for a period of 6 months, vacant 27th November, 1957.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15.

POPLAR HOSPITAL, East India Dock-road, E.14. House SURGEONS (2). Pre-registration posts commencing on 1st December, 1957. Duties include inpatient and outpatient work. Recognised for F.R.C.S.

Applications, with copy of at least 1 testimonial, should be sent to Hospital Secretary immediately.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN. MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD, SURREY. HOUSE OFFICER. Appointment will be made for 2 consecutive periods of 6 months commencing 1st December, 1957, or as soon thereafter as possible. First period as House Physician and second as House Surgeon and Casualty Officer.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned with copies of not more than 3 testimonials, not later than 18th November, 1957.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. SENIOR RESIDENT MEDICAL OFFICER (Male or Female), graded as Senior House Officer. Senior of 7 House Officers, in a hospital engaged in postgraduate and undergraduate teaching. Previous paediatric experience essential. Post vacant 1st February, 1958, at Hackney-road branch. Appointment for 1 year.

Application forms (obtainable from the Secretary at Hackney-road) should be returned with copies of 3 testimonials not later than 27th November, 1957.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE PHYSICIAN (pre-registration) required for 6 months, commencing 2nd January, 1958.

Applications, with copies of recent testimonials, to Hospital Secretary by 22nd November, 1957.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. SENIOR HOUSE SURGEON (Senior House Officer grade) required for 6 months, commencing 5th December, 1957. Post recognised for F.R.C.S.

Applications, with the names of 3 referees, to Group Secretary, West Ham Group Hospital Management Committee, Stratford, E.15 by 22nd November, 1957.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE SURGEON (pre-registration) required for 6 months, commencing 2nd January, 1958.

Applications, with copies of recent testimonials, to Hospital Secretary by 22nd November, 1957.

ROYAL NATIONAL THROAT, NOSE AND EAR HOSPITAL, AND INSTITUTE OF LARYNGOLOGY AND OTOLOGY, Gray's Inn-road, W.C.1, and Golden-square, W.1. Applications are invited for a post of SENIOR REGISTRAR, with effect from 1st January, 1958. The appointment will be for an initial period of 1 year, subject to annual re-election thereafter up to a maximum permissible term in this grade, and otherwise in accordance with the terms and conditions of service in the National Health Service. Applicants must have had considerable experience in general surgery and in this specialty and hold a higher surgical qualification.

Applications should give full information as to qualifications and experience, and the names of 2 referees, and be sent in duplicate to the House Governor before 28th November.

ROYAL NORTHERN HOSPITAL, Holloway, N.7. Applications are invited for the post of HOUSE PHYSICIAN (post- or pre-registration). Vacant 20th December, 1957.

Applications, with copies of recent testimonials, to be sent to the Hospital Secretary by 19th November, 1957.

ROYAL NORTHERN HOSPITAL, Holloway-road, London, N.7. CLINICAL ASSISTANT (part-time) required for medical outpatients. (G.P. grade.) Thursdays P.M. Vacant 2nd January, 1958. Tenable for 1 year.

Application forms from Hospital Secretary.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Women) (Senior House Officer grade). Appointment is for 6 months, renewable. Duties include care of children's ward, medical beds, E.N.T. and administration. Offers suitable experience to those intending to enter general practice. Vacant 18th January, 1958.

Form of application from the Secretary.

ST. JAMES' HOSPITAL, Balham, S.W.12. House PHYSICIAN (pædiatric). Vacant 11th December Post recognised for D.C.H. Successful candidate will also be required to assist in the Department of Pathology.

Applications, stating age, qualifications, experience, and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, at above address by 18th November. (0638.)

ST. JAMES' HOSPITAL, Balham, S.W.12. House PHYSICIAN required 18th November.

Applications, stating age, qualifications, experience, and names of 2 referees, to Group Secretary, Wandsworth Hospital Group, at above address immediately.

ST. MARY'S HOSPITAL, Paddington, W.2. Applications are invited from suitably qualified general medical practitioners for appointment as Part-time MEDICAL OUTPATIENT ASSISTANTS in the following vacancies, with effect from 1st January, 1958:—

Monday mornings
Tuesday mornings
Tuesday afternoons
Friday mornings

The appointments are for a first period of 12 months; remuneration to be at the rate of £183 15s. p.a., i.e. graded "General Practitioner."

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, by 20th November, 1957.

ST. MARY'S HOSPITAL, W.2. Ophthalmic Department. WESTERN OPHTHALMIC HOSPITAL, Marylebone-road, N.W.1. SENIOR REGISTRAR (whole-time, non-resident) required, duties to commence 1st February, 1958, or as soon as possible thereafter. Candidates must have postgraduate experience and should hold, or be studying for, the F.R.C.S.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, should reach ALAN POWDITCH, House Governor, St. Mary's Hospital, not later than 23rd November, 1957.

ST. ANDREW'S HOSPITAL, Devons-road, Bow, E.3. HOUSE PHYSICIAN. Recognised pre-registration appointment.

Applications, with copy of at least 1 testimonial, should be sent to Hospital Secretary immediately.

ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS. RESIDENT SURGICAL OFFICER (Registrar grade) required for St. Philip's Hospital on 1st February, 1958. Appointment for 6 months with opportunity for extension. Work includes medical urology and opportunity for research.

Apply in writing (12 copies), and names of 2 referees, to the House Governor, St. Peter's Hospital, Henrietta-street, W.C.2. Closing date 7th December, 1957.

ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. Registrar in Anæsthetics (whole-time), non-resident. The Hospital is recognised for the purposes of the F.F.A.R.C.S., D.A. Vacancy 17th December, 1957.

Application forms from the Group Secretary, St. Luke's Hospital, Sydney-street, London, S.W.3, to be returned as early as possible. (Enclose foolscap stamped addressed envelope.)

ST. THOMAS'S HOSPITAL, London, S.E.1. Surgical REGISTRAR (one vacancy). For a period of 1 year in the first instance from 1st March, 1958. There are 4 Surgical Registrar posts at St. Thomas's and in the Group, which are interchangeable, 2 of them being resident and 2 non-resident.

Applications, naming 2 referees, to the Clerk of the Governors by 22nd November, 1957.

ST. THOMAS'S HOSPITAL and the SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. (Joint appointment.) Whole-time SENIOR REGISTRAR to the Children's Department at St. Thomas's and Lambeth Hospitals, for a period of 1 year in the first instance from 1st April, 1958. 8 sessions per week at St. Thomas's Hospital and 3 sessions per week at the Lambeth Hospital.

Applications (6 copies), naming 3 referees, to the Clerk of the Governors, St. Thomas's Hospital, S.E.1, by 22nd November, 1957.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. RESIDENT HOUSE SURGEON wanted 1st December. Pre-registration candidates eligible.

Applications, with full particulars and names of 2 referees, to Hospital Secretary by 13th November.

WOOLWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (pathology). Vacant 1st January. The appointment is to the Group laboratories and is for 1 year. Salary £819 10s. p.a., less £150 p.a. if resident.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

ABERDEEN SPECIAL HOSPITALS BOARD OF MANAGEMENT. SENIOR HOUSE OFFICER (anæsthetics). Applications are invited for this post, the duties of which include work in the anæsthetics pool of the North-Eastern Hospital Region. The post, which is tenable for 1 year in the first instance, is recognised for the D.A. and F.F.A.R.C.S.

Applications, stating age, qualifications and experience, should be sent forthwith to the Group Medical Superintendent, Aberdeen Special Hospitals, Royal Aberdeen Hospital for Sick Children, Westburn-drive, Aberdeen.

ALEXANDRIA, DUNBARTONSHIRE. VALE OF LEVEN HOSPITAL. BOARD OF MANAGEMENT FOR DUNBARTONSHIRE HOSPITALS. Applications are invited for the post of SENIOR HOUSE OFFICER in Surgery and Gynæcology. The appointment will be for 1 year in the first instance.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be forwarded to the Secretary, Board of Management for Dunbartonshire Hospitals, Vale of Leven Hospital, Alexandria, Dunbartonshire.

ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds.) STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE SURGEON for general surgical duties. 6 months' appointment, vacant in early December, 1957. Preference given to pre-registration candidates.

Applications, stating age, qualifications and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital.

BARNSTAPLE. NORTH DEVON INFIRMARY (Central Group Hospital of 105 Beds). SENIOR HOUSE SURGEON. Post vacant 13th January, 1958, for 1 year. Salary £819 10s. p.a. Furnished flat available for rental.

Applications, with customary details, to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

BARNSTAPLE. NORTH DEVON INFIRMARY. (105 Beds.) HOUSE SURGEON (pre-registration); vacant now. The Hospital serves a wide area of pleasant countryside and the post affords good opportunity to study excellent clinical material.

Apply to Group Secretary, 19, Alexandra-road, Barnstaple.

BEDFORD GENERAL HOSPITAL. (436 Beds.) 2 House SURGEONS required. Pre- or post-registration; recognised for F.R.C.S. One vacant now, one end of November. Posts offer exceptional opportunities for general experience in busy acute surgical units.

Inquiries and applications, with copies of 2 recent testimonials, to be sent immediately to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (436 Beds.) Ortho-PÆDIC HOUSE SURGEON required. Vacant now. Pre- or post-registration; recognised for F.R.C.S. Post offers wide experience in a busy specialist orthopædic and traumatic unit.

Inquiries and applications, with copies of 2 recent testimonials, to be sent immediately to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BEDFORD GENERAL HOSPITAL. (436 Beds.) Senior HOUSE OFFICER in Medicine, vacant mid-November, tenable for 12 months. Pædiatric experience an advantage.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

BATLEY. THE GENERAL HOSPITAL, Carlinghow-hill, BATLEY. Applications are invited for the post of HOUSE SURGEON (resident) (ophthalmic and general surgery). The Hospital has 99 Beds, which are allocated to the specialties of general surgery, E.N.T., orthopædic and ophthalmology.

Apply in writing to the Administrative Officer, enclosing copies of 2 testimonials.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) HOUSE PHYSICIAN (House Officer or Senior House Officer grading according to experience).

Apply Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 acute beds.) ORTHOPÆDIC HOUSE SURGEON (first, second or third post), vacant now. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully registered practitioners may apply. Recognised for F.R.C.S.

Apply Group Secretary.

BIRMINGHAM ACCIDENT HOSPITAL AND REHABILITATION CENTRE, Bath-row, BIRMINGHAM, 15. SENIOR HOUSE SURGEON. Applications are invited for post now vacant. Hospital is largest traumatic unit in the country and treated 53,000 new patients last year, including 2000 thermal injuries. Post offers ample opportunity for practical experience in management of all types of injury—orthopædic, thoracic, abdominal and neurosurgical cases. Hospital is recognised for casualty training by Royal College of Surgeons.

Applications, with details naming 2 referees, to Administrator.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

St. Margaret's Hospital, Group 4, Great Barr Park, Birmingham, 22a

REGISTRAR (mental diseases) whole-time. Experience specialty/high qualification desirable. Hospital (1470 Beds) recognised for D.P.M. Resident/non-resident.

Birmingham (Selly Oak) Group, Oak Tree-lane, Birmingham, 29

REGISTRAR (surgical) for Birmingham Accident Hospital. Duties with Accident Surgery Team and Medical Research Council Burns Unit. General surgical experience essential. Higher qualifications an advantage. Opportunity for research.

Dudley Road Group, Dudley Road Hospital, Birmingham, 18

REGISTRAR (obstetrics and gynæcology) for Marston Green Maternity Hospital, Berwicks-lane, near Birmingham (120 obstetric and 10 gynæcological beds). Enlargement of Gynæcological Department anticipated. Recognised for obstetric part of M.R.C.O.G., affiliated to Medical School for training students. Resident. Experience specialty essential.

Application forms from Group Secretaries to be returned by 18th November, 1957.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. THE BIRMINGHAM AND MIDLAND HOSPITALS FOR WOMEN (incorporating the Hospital for Women and the Birmingham Maternity Hospital), Showell Green-lane, SPARKHILL, BIRMINGHAM, 11. Applications are invited for the post of RESIDENT OBSTETRICAL AND GYNÆCOLOGICAL REGISTRAR, vacant immediately. The successful candidate will be required to alternate duty at the Hospital for Women and the Maternity Hospital, for specific periods. The post is recognised for the M.R.C.O.G., and applicants should have held House appointments and at least one obstetrical and gynæcological post.

Forms of application may be obtained from, and should be returned not later than 21st November, 1957, to, the House Governor at the above address. G. A. PHALP, Secretary.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS AND THE BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications are invited for the joint whole-time appointment of NON-RESIDENT REGISTRAR in Diagnostic Radiology (Senior Registrar grade). The duties will be apportioned at 5 sessions in the Teaching Hospital and 6 sessions in the Dudley Road Hospital Group, mainly at Dudley Road Hospital. Candidates must be registered medical practitioners, have had previous experience in the specialty, and possess a diploma in radiology.

Forms of application may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned by 23rd November, 1957.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the appointment of SURGICAL REGISTRAR (Registrar grade) to the Surgical Professorial Unit, United Birmingham Hospitals. Candidates must have held a resident appointment and should have the F.R.C.S. The successful candidate will be required to take part in a rota of resident duties.

Forms of application from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, to be returned by 16th November, 1957.

BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL, HAMPSHIRE. (334 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. HOUSE PHYSICIANS (Pre-registration Interns) required at the above General Hospital.

Applications to the Hospital Secretary immediately.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, WESTBOURNE. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (resident), vacant 20th December, 1957, for E.N.T. duties. The appointment is recognised for the D.L.O. diploma and facilities are provided for studying.

Applications to the Hospital Secretary, Royal Victoria Hospital, Shelley-road, Bournemouth.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (resident or non-resident) (casualty and orthopædics combined) required for post vacant 19th November, 1957. The post is recognised for the F.R.C.S. examination and is normally tenable for 12 months. The Unit consists of a Registrar and 2 Senior House Officers with an additional Senior House Officer during the summer months.

Applications to the Hospital Secretary.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER required mid-November for established Geriatric Department under control of Consultant Geriatrician. There are 360 geriatric beds at Queen's Park Hospital, Blackburn, Springfield Hospital, Blackburn, and Clitheroe Hospital, Clitheroe. Accommodation for married man may be available if required.

Applications, with names of 2 referees, to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BLACKBURN. QUEEN'S PARK HOSPITAL. Blackburn and District Hospital Management Committee. HOUSE OFFICER (obstetrics and gynæcology) required for busy Unit of 58 Beds taking normal and abnormal cases. Post vacant 15th January, 1958. Recognised for Membership and Diploma R.C.O.G.(Obstetrics).

Apply to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BOLTON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Group Laboratories

RESIDENT PATHOLOGIST (Senior House Officer grade). Now vacant, tenable for 12 months and recognised for the Dip. Path.

Bolton District General Hospital (607 Beds)

RESIDENT SENIOR HOUSE OFFICER IN MEDICINE. Vacant 1st December, and tenable for 12 months.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, to Group Secretary, The Royal Infirmary, Bolton.

BRIGHTON GENERAL HOSPITAL. Applications are invited for the appointment of HOUSE PHYSICIAN to the Medical Unit. Vacant 22nd November, 1957. This is a pre-registration appointment. Salary in accordance with national scales.

Applications, enclosing recent testimonials, and stating age, qualifications, experience, and giving the names of 2 referees, should be sent to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton, 7, as soon as possible.

BRISTOL. SOUTHMEAD GENERAL HOSPITAL GROUP MANAGEMENT COMMITTEE. Required at Southmead Hospital (570 Beds, including 133 maternity) RESIDENT SENIOR HOUSE OFFICER (anæsthetics) for 12 months, commencing 1st December, 1957.

Applications to be forwarded to the Group Secretary, Southmead Hospital, Bristol.

BURTON-ON-TRENT. THE GENERAL HOSPITAL. HOUSE SURGEON (general, pre-registration) required at the above Hospital immediately. Post recognised for F.R.C.S.

Applications to Group Secretary as soon as possible.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics, to the above Group of hospitals. The post, which is vacant, is based at Bury General Hospital, and is recognised for the D.A. examination.

Apply, stating full details and names of 2 referees, to H. WILKINSON, Esq., Group Secretary, Bury General Hospital, Walmersley-road, Bury, Lancs.

BUXTON. DEVONSHIRE ROYAL HOSPITAL. (252 Beds.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER, vacant 1st December, 1957. This Hospital is a large special hospital for the treatment and rehabilitation of all types of locomotor disorders. Duties are mainly medical and include work in the long-stay unit of the Manchester University Rheumatism Research Centre. The Hospital is recognised under the regulations for the Diploma in Physical Medicine, Part II, and the post also offers good medical experience.

Applications, stating age, experience and qualifications, together with the names of 2 persons for reference, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport, immediately.

CAMBRIDGE. THE UNITED CAMBRIDGE HOSPITALS. RESIDENT OBSTETRICAL OFFICERS (2), at Maternity Hospital, Mill-road, Cambridge, for 6 months from 1st January and 1st February, 1958, respectively. Second or subsequent post, recognised Pre-registration Service. Recognised for M.R.C.O.G. and D.Obst.R.C.O.G. examinations.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to Secretary, United Cambridge Hospitals, Addenbrooke's Hospital, Cambridge, by 23rd November. Interviews early December.

CARDIFF. ST. DAVID'S HOSPITAL. Senior House OFFICER required for Accident Unit at above Hospital.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of SENIOR HOUSE OFFICER (non-resident) in the Casualty/Orthopædic and Fracture Departments at the Cardiff Royal Infirmary. The successful applicant will spend 8 months of the appointment in the Casualty Department and 4 months in the Orthopædic and Fracture Departments. To commence duty as soon as possible.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of SENIOR REGISTRAR or REGISTRAR to the Department of Physical Medicine in this Teaching Hospital Group, where there are opportunities for postgraduate study.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the post of REGISTRAR to the Professorial Surgical Unit at the Cardiff Royal Infirmary, to commence 1st January.

Application forms are available from the Secretary to the Board at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CANTERBURY. KENT AND CANTERBURY HOSPITAL (277 Beds). GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months' appointment. Post vacant early in December, 1957. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. HOUSE SURGEON required on Surgical Unit of 78 Beds. Post recognised for F.R.C.S. examination and approved for pre-registration experience.

Applications, stating age, qualifications and experience, with copies of recent testimonials or the names of 2 referees, should be sent to the Secretary at above address.

CHELMSFORD AND ESSEX AND ST. JOHN'S HOSPITALS. Resident Locum ANÆSTHETIC REGISTRAR required from middle November to 31st December.

Applications to Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford, Essex.

CHELMSFORD AND ESSEX HOSPITAL. (161 Beds.) Applications are invited for the post of RESIDENT HOUSE SURGEON. Pre-registration post. The post will become vacant during the middle of November, and offers good surgical experience. Recognised for the F.R.C.S.

Applications, together with 2 recent testimonials, to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON (Senior House Officer, or House Officer (Intern) grade). 100 orthopædic beds. Post recognised for F.R.C.S. and Pre-registration Service. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, Chertsey, as soon as possible.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). CASUALTY OFFICER (Senior House Officer) required from 14th November, 1957. Resident or non-resident. The appointment is mainly that of Outpatient Sorting Officer and gives time and opportunity for reading for a higher qualification. Recognised for F.R.C.S. Salary in accordance with terms and conditions of National Health Service. Applications for a 6-month appointment would be considered.

Applications, together with names and addresses of referees, to Physician-Superintendent, St. Peter's Hospital, as soon as possible.

CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late Botley's Park War Hospital). (430 Beds.) RESIDENT HOUSE SURGEON (intern) required from 17th November, 1957. Salary in accordance with terms and conditions of National Health Service. Recognised for pre-registration service.

Applications, together with names and addresses of referees, to Physician-Superintendent, St. Peter's Hospital, Chertsey, as soon as possible.

CHICHESTER. ROYAL WEST SUSSEX HOSPITAL (202 acute beds). RESIDENT HOUSE SURGEON required for 6 months' appointment. National salary scales for either provisionally or fully registered practitioners. Post approved for pre-registration practitioners and F.R.C.S. 8 residents. Vacant 17th November, 1957.

Applications, stating age, experience, qualifications, with references or names of referees, to Senior Administrative Officer.

CHICHESTER. ST. RICHARD'S HOSPITAL. Chichester GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of MEDICAL REGISTRAR, resident or non-resident, mainly at St. Richard's Hospital (400 Beds). Post vacant 1st January, 1958. Registrar will have care of 100 acute medical and pædiatric beds under the supervision of the Consultant Physicians and Pædiatrician, and will also assist the Consultant Neurologist, Chest Physician and Thoracic Surgeon. Salary according to terms and conditions of service of hospital medical staff. Candidates may visit the hospital.

Forms from Group Secretary, 174, Broyle-road, Chichester, to be submitted within 14 days.

CHESTERFIELD. SCARSDALE HOSPITAL. Senior HOUSE OFFICER required for obstetrics and gynæcology at above Hospital. Post recognised for M.R.C.O.G. and D.Obst.R.C.O.G. purposes. National salary and conditions.

Further information obtainable from the Group Secretary, Chesterfield Hospital Management Committee, at Chesterfield Royal Hospital, to whom applications and copies of testimonials should be submitted immediately.

CHESTERFIELD HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER required immediately at Whittington Hall, Chesterfield (356 Beds for Female mentally deficient patients), and Scarsdale Hospital, Chesterfield, where there are 125 Beds for mental patients. Previous experience in psychiatry not essential. Ample opportunities for study. Flat available within the Group.

Apply, with names of 3 referees, to Group Secretary, The Royal Hospital, Chesterfield.

DERBY. DERBYSHIRE CHILDREN'S HOSPITAL. HOUSE SURGEON (pre-registration) or SENIOR HOUSE OFFICER required to commence 8th January, 1958. Recognised for D.C.H.

Applications, stating full particulars and names of 2 referees, to be sent as soon as possible to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SENIOR HOUSE OFFICER (orthopædic). Vacant 1st January. Recognised for 6 months' "unspecified" training for F.R.C.S.

Apply, giving full details and 2 names for reference, to Secretary.

DORCHESTER. DORSET COUNTY HOSPITAL. OBSTETRICAL AND GYNÆCOLOGICAL HOUSE SURGEON required for 6-monthly appointment, vacant early December, and recognised for D.Obst.R.C.O.G.

Applications, stating age, qualifications, experience and nationality, together with copy testimonials, to Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

DOUGLAS. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST. Senior House Officer grade. Resident staff of 4. National Health Service salary and conditions of service.

Apply to the Secretary, Noble's Isle of Man Hospital, Douglas.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Guest Hospital, Dudley. (154 Beds.)

CLINICAL ASSISTANT in E.N.T. Surgery, to assist at Outpatient Department on Monday and Tuesday afternoons.

Applications, with references, to Group Secretary, Guest Hospital, Dudley.

SENIOR HOUSE OFFICER (anæsthetics). Post recognised for D.A. Successful candidate will be required to visit other hospitals in the Group.

Applications, giving the names of 2 referees, to the Group Secretary, Guest Hospital, Dudley, Worcs.

SENIOR HOUSE OFFICER (surgical). Post vacant November, 1957.

HOUSE OFFICER (surgical), pre-registration. Post vacant now.

Apply Group Secretary, Guest Hospital, Dudley, Worcs.

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

(1) SENIOR REGISTRAR in Psychiatry, Suffolk Mental Hospitals. St. Clement's Hospital, Ipswich (440 Beds), and St. Audry's Hospital, Melton, near Woodbridge (1150 Beds) and associated General Hospital outpatient clinics. There is a very active Outpatient Department and Electroencephalographic Department at St. Clement's Hospital. Trainee post. Both hospitals are recognised for D.P.M. Married accommodation available. Candidates invited to visit the hospitals by direct arrangement with Medical Superintendent, St. Audry's Hospital.

(2) REGISTRAR in Chest Medicine, Ipswich Chest Clinic and St. Helen's Hospital, Ipswich (resident—house available). Preference will be given to candidates with an interest in the epidemiology of tuberculosis. Duties will include work with the new Community X-ray Survey Unit and the Associated School Tuberculosis Survey. Clinical duties in chest medicine and in infectious diseases will include work in the Outpatient Department and the wards of St. Helen's Hospital. Appointment for 1 year, renewable for second year. Candidates invited to visit the hospital by direct arrangement with Hospital Management Committee Secretary, Ipswich and East Suffolk Hospital, Anglsea-road, Wing, Ipswich.

Applications, stating age, experience and the names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 18th November, 1957.

EPSOM, SURREY. ST. EBBA'S HOSPITAL. St. Ebba's AND BELMONT GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the appointment of REGISTRAR at above Hospital. The Hospital (865 Beds) is principally concerned with the treatment of voluntary cases of good prognosis and has over 1300 admissions annually. There are full facilities for psychological and physical investigations and all modern treatment methods are used. The Hospital has Outpatient Departments and a special unit for juvenile psychiatric cases. Tutorials are given by senior staff in preparation for the D.P.M. and every assistance is given to staff to attend London neurological clinics. Full residential amenities are available. Candidates may visit the Hospital by appointment with the Physician-Superintendent.

Application forms may be obtained from the Group Secretary, St. Ebba's and Belmont Group Hospital Management Committee, Group Office, Belmont Hospital, Brighton-road, Sutton, Surrey, and completed forms should be returned to him within 2 weeks of the appearance of this advertisement.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from pre-registration and registered medical practitioners for the post of HOUSE SURGEON (general surgery). Vacant now.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary.

EDGWARE GENERAL HOSPITAL, Edgware, Middlesex. 2 RESIDENT HOUSE PHYSICIANS for above Hospital. Posts vacant 1st December, 1957. 6 months' appointments. Posts recognised for pre-registration purposes.

Applications, stating age, qualifications, experience and enclosing copies of up to 3 recent testimonials to Medical Director of Hospital by 23rd November.

HASLEMERE AND DISTRICT HOSPITAL. (82 Beds.) GUILDFORD GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (surgical, with charge of 12 acute medical beds). Duties to commence 1st January, 1958. Valuable experience in general and emergency surgery, orthopædic, E.N.T., gynæcological, children and casualty work.

Applications to Hospital Secretary, Haslemere and District Hospital, Haslemere, Surrey, not later than 16th November.

HASTINGS. ROYAL EAST SUSSEX HOSPITAL. (150 Beds.) Applications are invited for the post of HOUSE SURGEON (pre-registration), vacant on 30th November, 1957. This Hospital is the main surgical hospital in the Hastings area and the post offers excellent experience.

Apply, with 2 testimonials or names of 2 referees, to the Administrator of the Hospital not later than Friday, the 15th November, 1957.

HEMEL HEMPSTEAD. WEST HERTS HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR required at above Hospital. New post. Application made for recognition by Faculty.

Application forms obtainable from and returnable to Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by 19th November, 1957.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for the appointment of HOUSE SURGEON (general), first or second post. To commence 27th November, 1957. Pre-registration post, recognised under F.R.C.S. regulations.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HILLINGDON HOSPITAL, Uxbridge, Middlesex. (621 Beds.) 3 HOUSE SURGEONS required in General Surgery. General and Traumatic, General and Gastro-enterology and General and Genito-urinary. All posts recognised for F.R.C.S. and for pre-registration service.

Apply, together with copies of 3 recent testimonials, to Medical Director by 18th November.

HITCHIN. LISTER HOSPITAL. (305 Beds.) North West METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time MEDICAL REGISTRAR required at above Hospital. Preference given to applicants having experience in medical emergencies. Post vacant 1st January, 1958. Hospital may be visited by direct appointment (Hitchin 3701).

Application forms obtainable from Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, and returnable by 25th November, 1957.

HORNCHURCH. ST. GEORGE'S HOSPITAL. Ingre-BOURNE CENTRE. Temporary PSYCHIATRIC REGISTRAR required for not exceeding 3 months at the above Neurosis Unit. Mental hospital experience essential. Candidates should be specially interested in short term psychotherapy and social psychiatry. Further information may be obtained from the Hospital, which may be visited by arrangement (Tel.: Hornchurch 4181).

Applications, stating names of 2 referees, should be sent to the Group Secretary, Oldchurch Hospital, Romford.

HOUNSLOW HOSPITAL, Staines-road, Hounslow, MIDDLESEX. (General acute—81 Beds.) Applications are invited for the appointment of RESIDENT HOUSE SURGEON. Recognised pre-registration appointment for 6 months. Vacant 28th November, 1957.

Applications, stating qualifications and age, together with copies of 3 recent testimonials, or names for reference, to the Hospital Secretary.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee,
The Royal Infirmary, Huddersfield.

HULL A GROUP HOSPITAL MANAGEMENT COM-MITTEE. HOUSE PHYSICIAN, Pædiatric Unit. Duties at Victoria Childrens Hospital for 3 months followed by 3 months on the pædiatric wards, Western General Hospital. An interesting and varied post which includes outpatient and casualty work. This appointment, which commences on 18th December, 1957, is recognised for the D.C.H.

Apply, giving experience, testimonials, &c., to the Secretary, Victoria Hospital for Sick Children, Park-street, Hull.

IPSWICH. FOXHALL HOSPITAL. (102 Beds for chest diseases.) SENIOR HOUSE OFFICER. The Hospital is actively engaged in the investigation and treatment of all forms of chest disease, including major thoracic surgery and a respiratory function unit. House available.

Applications, with copies of recent testimonials, to Physician-Superintendent, from whom further details may be obtained.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. Senior HOUSE OFFICERS (2), Maternity Department. Must have held medical, surgical, obstetrical and gynæcological house posts. Vacant 1st January.

Applications, stating age, nationality, qualifications, with copies of up to 3 recent testimonials, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 20th November.

ISLEWORTH. WEST MIDDLESEX HOSPITAL (South MIDDLESEX HOSPITAL SURGICAL ANNEXE). HOUSE SURGEON (pre-registration), Surgical Annexe of West Middlesex Hospital at South Middlesex Hospital (30 Beds). Duties include some assistance on Infectious Diseases Unit. Post vacant 11th December.

Applications, stating age, qualifications and experience, with copies of up to 2 recent testimoinals, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 19th November.

ISLEWORTH. WEST MIDDLESEX HOSPITAL. House OFFICER (general surgery), vacant 1st January, 1958.

Applications, stating age, qualifications, experience, and enclosing copies of up to 2 testimonials, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, by 20th November.

ISLE OF MAN. BALLAMONA HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Mental Hospital (360 Beds, admission rate 200 annually) which undertakes all modern methods in the treatment of mental and nervous diseases as well as mental deficiency, and is recognised for training for the Conjoint D.P.M. A choice of 2 furnished flats is available. The terms and conditions of service are those of the Isle of Man Health Service, the same as those of the National Health Service. Superannuation is transferable. The Hospital may be visited by appointment.

Those interested should write for further details, and applications, stating age, nationality, qualifications and experience, together with the names of 2 referees, should be sent to the Medical Superintendent.

KEIGHLEY AND DISTRICT VICTORIA HOSPITAL, KEIGHLEY, YORKS. (General—139 Beds.) 2 RESIDENT HOUSE SURGEONS (either sex).

General surgery and E.N.T., vacant now.

General surgery and orthopædics, vacant now.

Both recognised for F.R.C.S. and approved pre-registration appointments, tenable for 6 months in first instance. 4 residents on staff.

Applications, with full particulars as to age, nationality, and qualifications, and copies of 2 testimonials, to Group Secretary, St. John's Hospital, Keighley, Yorks.

KENDAL. WESTMORLAND COUNTY HOSPITAL. (82 Beds.) RESIDENT SENIOR HOUSE OFFICER (medical). Duties include the care of acute cases under the supervision of 2 Consultant Physicians, and attendance at consultative clinics. Post vacant 1st December, 1957, and tenable for 1 year.

Applications, with full particulars and names of 2 referees, to be addressed to Group Secretary, Royal Lancaster Infirmary, Lancaster.

KETTERING DISTRICT GENERAL HOSPITAL. The post of CASUALTY OFFICER (Senior House Officer), recognised for F.R.C.S., is vacant early December, 1957. It offers wide experience of all traumatic conditions, including fractures and some orthopædic cases with charge of 30 beds.

Applications, accompanied by testimonials, to be sent to the Group Secretary, General Hospital, Rothwell Road, Kettering.

LEEDS REGIONAL HOSPITAL BOARD. Senior Regis-TRAR vacancies.

Anæsthetics

Hull A Group of hospitals with additional duties as required in the Hull B and East Riding Groups. Non-resident. Post vacant 1st April, 1958.

Ophthalmology

Royal Eye and Ear Hospital, Bradford (34 ophthalmic beds). Additional duties as required in other hospitals in the Bradford A and B Groups. Non-resident.

Psychiatry

(i) Storthes Hall Hospital, Kirkburton, near Huddersfield (2600 Beds), and associated clinics. Resident or non-resident.

(ii) De la Pole Hospital, Willerby, Hull (1000 Beds). This Hospital has a high admission-rate and a separate neurosis unit for females. Duties also include visits to the Psychiatric Day Centre, Hull, and an outpatient clinic at Goole. It is anticipated that the successful candidate will undertake 2 clinical sessions (which may include research) in association with the Department of Psychiatry of the University of Leeds. Small flat available for married person, otherwise non-resident.

Candidates for both these appointments should hold the D.P.M. or equivalent qualification

Applications, stating age, qualifications and details of appointments held showing dates, together with the names and addresses of 3 referees, should be forwarded to the Secretary, Park-parade, Harrogate, by 21st November, 1957.

LEEDS. UNITED LEEDS HOSPITALS / LEEDS REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR vacancies.

General Surgery

Training will be mainly at the General Infirmary at Leeds, but the person appointed will be required to undertake periodical duties at Regional Hospitals as provided for in the surgical training scheme.

Obstetrics and Gynæcology (2 posts)

Appointments will be made jointly to the Teaching and to Regional Hospitals and at least 1 year's training will be give at the Teaching Hospital. The initial year for 1 of the appointments will be at the United Leeds Hospitals and for the other at St. Luke's Hospital, Bradford.

Applications, stating age, qualifications and details of appointments held showing dates, together with the names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 21st November, 1957.

LEICESTER GENERAL INFIRMARY. Applications are invited for the post of SENIOR HOUSE OFFICER (pathology) now vacant, recognised for the D.Path.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, to the Group Secretary, No. 1 Hospital Management Committee, The Leicester Royal Infirmary, immediately.

LINCOLN COUNTY HOSPITAL, Sewell-road, Lincoln. (200 Beds.) Applications are invited from pre-registration candidates for appointment as HOUSE SURGEON for 6 months, to be followed, if satisfactory, by appointment as House Physician for a further 6 months.

Full particulars should be sent to R. W. HOWICK, Group Secretary.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL EAR, NOSE AND THROAT INFIRMARY. Applications are invited for a resident post of SENIOR HOUSE OFFICER in Otorhinolaryngology for the period to 30th September, 1958.

Apply immediately on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LLANELLY HOSPITAL, Llanelly. (164 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER in the Casualty Department of the above Hospital.

Full particulars, stating age, experience and qualifications, together with copies of 2 recent testimonials should be forwarded to the Hospital Secretary. T. E. JONES, Group Secretary.

LLANELLY HOSPITAL, Llanelly. (162 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics at the above Hospital. The Hospital is recognised for the D.A. examination. The successful candidate will be granted facilities to attend monthly anæsthetic lectures and discussions which are held at the Cardiff Royal Infirmary.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be sent to the Secretary of the Hospital. T. E. JONES, Group Secretary.

MAIDSTONE. PRESTON HALL HOSPITAL, British LEGION VILLAGE, MAIDSTONE, KENT. Applications are invited for the post of SENIOR HOUSE OFFICER at the above Hospital, which contains 330 Beds for the treatment of pulmonary tuberculosis and other chest diseases and includes a major thoracic surgical unit. Married accommodation may become available. Salary £819 10s. p.a., national scale and conditions.

Applications, stating age, qualifications and experience with relevant dates, together with names and addresses of 2 referees, to be sent to the Group Secretary by 6th December, 1957.

MANCHESTER, 20. CHRISTIE HOSPITAL AND HOLT RADIUM INSTITUTE. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered practitioners for the post of ASSISTANT RESIDENT SURGICAL OFFICER (Senior House Officer grade). The post provides experience in the treatment of tumours and good opportunity for study.

Applications, with full details, including the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

MANCHESTER. CRUMPSALL HOSPITAL. Applications are invited for the post of REGISTRAR in the Department of Neurosurgery at the above Hospital. A new Department of over 20 Beds for adult cases is being started and will become a self-contained unit. Facilities will be made available for the successful applicant to gain experience in psycho-surgery at neighbouring hospitals and, if desired, paediatric surgery.

Applications, with names of 2 referees, by 16th November, 1957, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester.

MANCHESTER, 8. CRUMPSALL HOSPITAL. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer) with duties in the Department of Orthopædic Surgery. Recognised for F.R.C.S. Vacant 1st December, 1957.

Applications, with names of 2 referees, by 18th November, 1957, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester 8.

MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE, BAGULEY HOSPITAL (402 Beds). The Board invite applications for the post of REGISTRAR in Chest Diseases. This Hospital is a large Thoracic Unit fully equipped for the medical and surgical treatment of tuberculosis and other chest diseases. Attached to the hospital is a Chest Clinic. The post offers opportunities for wide experience in medical and surgical treatment of patients suffering from tuberculosis and other diseases of the chest, together with chest clinic work. Ample scope for clinical research.

Applications, stating age, qualifications, nationality, experience and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, within 7 days of appearance of this advertisement.

MANCHESTER. ROYAL MANCHESTER CHILDREN'S HOSPITAL, PENDLEBURY. Applications invited for the resident appointment of MEDICAL HOUSE OFFICER, vacant 1st February, 1958. Post is tenable for a period of 6 months and is open to pre-registration graduates.

Applications to Hospital Secretary not later than 2nd December, 1957.

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER to a General Medical Unit, to commence as soon as possible. Whole-time, non-resident post, tenable for 6 months, renewable for a second and possibly a third 6 months.

Application form, obtainable from the undersigned, to be returned by 13th November, 1957. G. H. TAYLOR, Secretary.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for 2 posts of HOUSE OFFICER in Obstetrics, normally but not necessarily for provisionally registered medical practitioners. Salary in accordance with national scales. The appointments are for 6 months from 1st February, 1958.

Application forms may be obtained from the undersigned and returned not later than 25th November, 1957.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of REGISTRAR in the Neonatal Unit of Saint Mary's Hospitals (attached to the University Department of Child Health). The post is full-time and resident, and vacant 1st January, 1958. It is preferable but not essential that candidates should hold a higher qualification. Previous experience in pædiatrics essential. The post is tenable for 12 months and the salary is in accordance with the national scale.

Application forms may be obtained from the undersigned and should be completed and returned by 15th November, 1957,

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of SENIOR HOUSE OFFICER in Gynæcology. Applicants must have had previous hospital experience in medicine and surgery. The post is recognised for the purpose of the M.R.C.O.G. examination. The appointment is for 6 months starting 1st February, 1958. Salary in accordance with national scale.

Application forms may be obtained from the undersigned and returned not later than 25th November, 1957.

A. R. WISE, General Superintendent,

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited from registered medical practitioners, Male or Female, for the post of HOUSE PHYSICIAN in the Neonatal Unit of Saint Mary's Hospitals (attached to the University Department of Child Health) for a period of 6 months, vacant on the 1st February, 1958. Previous hospital experience essential and pædiatric experience desirable. Duties include the care of the newborn in the maternity department, the care of infants in the infants' ward and work in the clinic under the charge of the Department of Child Health. Salary in accordance with national scale.

Applications, stating qualifications and experience, together with the names of 3 referees, should be sent to the undersigned not later than 25th November, 1957.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER. MONSALL HOSPITAL, Newton Heath, MANCHESTER, 10. SENIOR HOUSE OFFICER required (resident) for Infectious Diseases wards.

Applications, with names of 2 referees, to Group Secretary, Booth Hall Hospital, Manchester, 9, from whom further particulars may be obtained.

MEXBOROUGH. MONTAGU HOSPITAL AND ANNEXE. (198 Beds—22 obstetrics, 15 gynæcology.) Locum SENIOR HOUSE OFFICER (obstetrics and gynæcology) required 16th to 29th December, 1957. Residential emoluments £150 p.a.

Applications to Secretary, Hospital Management Committee, Fern Bank, Doncaster-road, Rotherham.

MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT ANÆSTHETIST for joint duties at the West Kent General Hospital, and the Kent County Ophthalmic and Aural Hospital, Maidstone (total beds 254). The post, which is of Senior House Officer grade, carries a salary of £819 10s. a year less £150 for residential emoluments. Excellent experience under Consultant Anæsthetists is available, and the post is recognised for the F.F.A. R.C.S. examination.

Applications, stating age, nationality, qualifications and experience, together with the names of 2 suitable referees, should be forwarded to the Administrative Officer, West Kent General Hospital, Maidstone.

NEWCASTLE REGIONAL HOSPITAL BOARD. West CUMBERLAND GROUP OF HOSPITALS. REGISTRAR in Obstetrics and Gynæcology required from 1st January, 1958 (resident or non-resident), to be based at Whitehaven Hospital or Workington Infirmary as may be decided by the Committee. In the group there are 26 gynæcology beds and 47 obstetric beds. New Maternity Department of 36 Beds opening at Workington Infirmary in January, 1958. Appointment is for 12 months in the first instance.

Applications, with names of 3 referees, should be sent to Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD. Locum Tenens REGISTRAR PSYCHIATRIST, whole-time, for the Department of Psychological Medicine, Newcastle General Hospital, for a period of approximately 5 months. Single accommodation available, married person may live out by arrangement.

Applications, with names and addresses of 3 referees, to Regional Psychiatrist, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, immediately.

NEWCASTLE REGIONAL HOSPITAL BOARD. Regis-TRAR PATHOLOGIST, whole-time, for Sunderland Group of hospitals. Good experience in all branches of clinical pathology. Post recognised for Diploma in Pathology.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the non-resident appointment of SENIOR HOUSE OFFICER in the Department of Ophthalmology at the Royal Victoria Infirmary. The appointment will be for 1 year, and will be subject to terms and conditions of service of hospital medical staff in the National Health Service. The salary will be at the rate of £819 10s. p.a., subject to the appropriate deductions.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne, 1.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of SENIOR REGISTRAR OPHTHALMOLOGIST, in the first year tenable at the Royal Victoria Infirmary which is the teaching hospital of the University of Durham. The successful candidate will have opportunity for clinical experience in outpatient and inpatient work under the direction of the Head of the Department and will be responsible for clinical emergency duty as required. Applicants must possess the D.O.M.S. or higher qualification. The appointment is for 1 year in the first instance, and may be renewed to a maximum of 4 years. In any reappointment the successful candidate may be required to undertake duty in a hospital under the Newcastle Regional Hospital Board. The appointment will be subject to the terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. ST. NICHOLAS HOSPITAL, GOSFORTH, NEWCASTLE UPON TYNE, 3. ST. NICHOLAS HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER (2 years in first instance). This Mental Hospital (1150 Beds) affords opportunities for experience of all modern methods of investigation and treatment. There is an extensive outpatient service, and facilities are given to study for the D.P.M.

Applications, giving details of qualifications and experience, together with names and addresses of 2 referees, to be submitted to the Group Secretary.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of HOUSE PHYSICIAN, vacant 21st December, 1957. Duties include house charge of general medical and pulmonary tuberculosis beds. The post is recognised for pre-registration, is resident and tenable for 6 months. Salary in accordance with national scale.

Applications, with 3 recent testimonials, to Medical Superintendent.

NEWMARKET GENERAL HOSPITAL, Suffolk. Applications are invited for the post of SENIOR HOUSE OFFICER for Orthopædic and Casualty duties, which falls vacant in early December. The post is resident.

Applications, giving age, experience and qualifications, together with 3 recent testimonials, should be sent to the Medical Superintendent.

NORTHAMPTON (near). CREATON HOSPITAL. (138 Beds.) Applications are invited from suitably qualified medical practitioners for the post of SENIOR HOUSE OFFICER. The Hospital has 138 Beds, and is for the treatment of both pulmonary and non-pulmonary tuberculosis. There is a major thoracic surgical unit for tuberculosis and non-tuberculous diseases of the chest.

Applications, stating age, experience and qualifications, together with the names and addresses of 2 referees, should be sent to the Secretary, Northampton and District Hospital Management Committee, General Hospital, Northampton, within 7 days of the appearance of this advertisement.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOS-PITAL. Applications are invited for the post of HOUSE PHYSICIAN for General Medicine and Neurology. Vacant 1st December, 1957. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 19th November, 1957.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON, mainly orthopædic and genitourinary surgery. This is a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 19th November, 1957.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE PHYSICIAN to the Radiotherapy Department. This post is recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 19th November, 1957.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer), recognised by the Royal College of Surgeons. Vacant 1st December, 1957.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 19th November, 1957.

NORTHWOOD, MIDDLESEX. MOUNT VERNON HOSPITAL. Applications are invited for the post of HOUSE SURGEON for general surgery. Recognised for the final F.R.C.S. in general surgery, and recognised as a pre-registration appointment.

Applications, accompanied by 2 testimonials, to be forwarded to the Resident Medical Officer, Mount Vernon Hospital, Northwood, Middlesex, by 19th November, 1957.

NOTTINGHAM. CITY HOSPITAL. (811 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (general surgery) vacant 23rd December. The post is approved for the F.R.C.S. The officer appointed will also be required to undertake certain duties in the Orthopædic Department. A deduction of £150 p.a. will be made for residential emoluments.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds. Recognised for the D.C.H.) Applications are invited for the post of SENIOR HOUSE OFFICER (surgical) which will be vacant end November. The post is tenable for 6 months or a year by agreement.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

OSWESTRY. THE ROBERT JONES AND AGNES HUNT ORTHOPAEDIC HOSPITAL. SENIOR SURGICAL HOUSE OFFICER (resident) required at once.

Apply Secretary.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. Vacancies exist in the following departments:

HOUSE SURGEON (pre-registration post), vacant 1st December. Recognised at the F.R.C.S., Devonport Hospital.

HOUSE SURGEONS (pre-registration posts), vacancies 9th December, 1957, 1st and 4th January, 1958. Recognised for the F.R.C.S. Greenbank Road Hospital.

In both cases send names of 3 referees to the Group Secretary, 7, Nelson-gardens, Devonport.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL. FREEDOM FIELDS HOSPITAL. Central Casualty Department.

SENIOR HOUSE OFFICER in Casualty, vacant 1st January, 1958. Recognised for the F.R.C.S.

Applications, stating names of 3 referees, to be sent to the Group Secretary.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Royal Portsmouth Hospital

(1) **Orthopædic Department** (104 Beds)

(*a*) SENIOR HOUSE OFFICER required. Vacant 1st December, 1957.

(*b*) HOUSE OFFICER (pre-registration), vacant now.

(2) SENIOR HOUSE SURGEON (70 surgical beds). Vacant 11th November, 1957.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

St. Mary's Hospital, Milton-road, Portsmouth.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER to the Department of Geriatric Medicine which is being developed at Battle Hospital, Reading, under the charge of a Consultant Geriatric Physician.

Further particulars may be obtained from the Group Secretary, 3, Craven-road, Reading, to whom applications, stating age, qualifications and names of 3 referees, should be addressed.

READING. ROYAL BERKSHIRE HOSPITAL. (398 Beds.) Applications are invited from registered and provisionally registered medical practitioners, Male and Female, for resident post of HOUSE SURGEON, vacant 1st December, 1957, and tenable for 6 months.

Write, before 15th November, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary.

READING AREA DEPARTMENT OF MEDICINE. Applications are invited from registered and provisionally registered medical practitioners for 2 posts as RESIDENT HOUSE PHYSICIAN vacant 1st December, 1957, for a period of 6 months. Successful candidates will be required to carry out duties at the following Reading hospitals: Royal Berkshire (398 Beds), Battle (390 Beds), and Prospect Park (104 Beds).

Write immediately, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary, Royal Berkshire Hospital, Reading.

READING. BATTLE HOSPITAL. (391 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON in the Accident and Orthopædic Department. Post vacant 1st November, 1957. F.R.C.S. recognised. Also casualty duties.

Apply, stating age, qualifications with dates, nationality, present post, with 1 copy of recent testimonial, to Hospital Secretary.

RICHMOND, SURREY. ROYAL HOSPITAL. House SURGEON (pre-registration) required 27th November for busy acute General Hospital with full consultant staff.

Applications invited immediately (acceptable in advance of examination results) giving age, qualifications, and names of 2 referees, to Administrative Officer.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (620 Beds.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER to work in the Chest Unit (72 Beds) at the General Hospital, Rochford, and at the Lancaster House Chest Clinic, Southend-on-Sea, to commence duty mid-December. Good experience in general medicine essential, and previous experience in tuberculosis and diseases of the chest desirable. Salary £819 10s. p.a.

Applications, stating age, &c., to be sent to the undersigned by 23rd November, 1957. J. C. FIELD, Secretary.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (620 Beds.) Applications required from pre-registration candidates for a 6 months' appointment of HOUSE SURGEON (recognised for F.R.C.S.), to be followed, subject to satisfactory service, by a 6 months' appointment as House Officer (obstetrics) recognised for D.Obst.R.C.O.G. Post vacant 18th November.

Applications, accompanied by 1 testimonial, to reach the undersigned by 13th November. J. C. FIELD, Secretary.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (620 Beds.) HOUSE PHYSICIAN (pre-registration) required. Vacant 1st December, 1957.

Applications, &c. (1 testimonial only necessary from pre-registration applicant seeking first appointment) to be sent to the undersigned by 19th November, 1957.

J. C. FIELD. Secretary.

ROCHFORD, ESSEX. GENERAL HOSPITAL. (620 Beds.) Applications are required from pre-registration candidates for a 6 months' appointment of HOUSE SURGEON (recognised for F.R.C.S.) at the above Hospital. Post vacant 24th November, 1957.

Applications, &c. (1 testimonial only necessary from pre-registration candidates seeking first appointment) to be sent to the undersigned by 19th November, 1957.

J. C. FIELD, Secretary.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL (722 Beds). ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit from 3rd December, 1957. The service consists of 100 Beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as soon as possible.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) RESIDENT PÆDIATRIC HOUSE PHYSICIAN (Male or Female) required from 4th December, 1957. The Department includes a Premature Baby Unit of 9 Cots and 50 children's medical beds.

Applications should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, at the Hospital.

ROTHERHAM. MOORGATE GENERAL HOSPITAL. (342 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (obstetrics and gynæcology) required immediately. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 18th November, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON (recognised by R.C.O.G.)/HOUSE SURGEON from 1st December, 1957, for a period of 6 months in each post commencing with House Surgeon post. The posts are open to pre-registration candidates.

Apply, giving names and addresses of 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON to the Obstetric and Gynæcological Department, which becomes vacant on 1st January, 1958. The post is open to pre-registration candidates and is recognised for the Diploma and Membership of the Royal College.

Apply, stating age, nationality, qualifications, experience, and giving names and addresses of 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD DERMATOLOGY. Applications are invited for the post of REGISTRAR in Dermatology at Dundee Royal Infirmary (534 Beds) the main general teaching hospital associated with the University of St. Andrews. Salary and conditions of service in accordance with national agreement.

Further particulars and forms of application from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 23rd November, 1957.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD invite applications for 2 Posts under the Combined Training Scheme in Hospital and General Practice in which the Board and the Executive Council for the County of Inverness are associated. The scheme provides a training of 2 years' duration for young medical practitioners intending to enter general medical practice or a specialty. Concurrent experience is given in various departments of the hospitals and with selected general practitioners in the town of Inverness. The trainees' time is divided equally between hospital work and general practice. The posts are non-resident. They are graded at Senior House Officer or Registrar level according to the hospital duties and the corresponding salaries are £819 10s. rising in the second year to £850, and £850 rising in the second year to £935.

Candidates should apply by 30th November, 1957, on forms obtainable from the undersigned, by whom further particulars will be supplied on request.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. SOUTH-EASTERN REGIONAL HOS-PITAL BOARD. SENIOR REGISTRAR in Medicine in the Edinburgh Northern Group of hospitals. The appointment will be initially at the Western General Hospital, where both under- and postgraduate teaching takes place. Facilities will be available for research.

Apply, giving age, qualifications and previous experience, and the names of 3 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3 (from whom further particulars may be obtained), by 30th November, 1957.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance :—

SENIOR REGISTRAR in Radiotherapy based at the Western Infirmary, Glasgow.

REGISTRAR in Ophthalmology based at the Eye Infirmary, Glasgow.

REGISTRAR in Pathology based at the Victoria Infirmary, Glasgow.

REGISTRAR in Surgery based at the Stirling Royal Infirmary.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, by 23rd November, 1957.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY. REGISTRAR required in Neurological Surgery. Experience in this specialty desirable but not essential. Appointment would be most valuable to trainee surgeon who may eventually have care of head injuries. If so desired appointment might be held for 6 months only.

Applications, stating age, qualifications and experience, with the names of 3 referees, should be sent not later than 13th November, 1957, to the Chief Administrative Officer, The United Sheffield Hospitals, West-street, Sheffield, 1.

SHEFFIELD REGIONAL HOSPITAL BOARD. Locum RESIDENT REGISTRAR (orthopædics) required immediately at City General Hospital, Sheffield. Remuneration £19 5s. per week.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, naming 2 referees.

SHREWSBURY. ROYAL SALOP INFIRMARY/COPTHORNE HOSPITAL. (500 Beds.) Senior House Officer to work as CLINICAL PATHOLOGIST to Group Laboratory. Appointment tenable for 1 year, resident or non-resident. Vacant 1st January, 1958. A Unit of the Public Health Laboratory service is housed in the same building and there are facilities for training in all the 4 main branches of pathology.

Applications to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury, naming 3 referees.

SHREWSBURY. ROYAL SALOP INFIRMARY. (241 Beds.) SENIOR HOUSE OFFICER (casualty), resident or non-resident. Duties from 9 A.M. to 6 P.M. daily, except Saturday which will be 9 A.M. to 1 P.M. Applicant required to do 1 weekend's duty in 3. Post recognised for F.R.C.S. Vacant 14th December, 1957.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. HOUSE SURGEON required, pre-registration post, vacant 27th November.

Applications, with names of 2 referees, to Secretary.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum MEDICAL REGISTRAR required from 17th November.

Applications, with names of 2 referees, to Secretary.

SOUTHALL, MIDDLESEX. ST. BERNARD'S HOSPITAL FOR NERVOUS AND MENTAL DISORDERS. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR required at above Hospital. Hospital undertakes all modern psychiatric treatments both physical and psycho-therapeutic, and the medical staff conduct several psychiatric outpatient clinics. Hospital may be visited by direct appointment.

Application forms obtainable from and returnable to the Group Secretary, St. Bernard's Hospital Management Committee, St. Bernard's Hospital, Southall, Middlesex, within 2 weeks of the appearance of this advertisement.

SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for an appointment as Whole-time REGISTRAR in Pædiatrics to fill a vacancy in the approved trainee establishment at the Bromley, Kent, Group of hospitals for duties mainly at Farnborough Hospital, Farnborough, Kent, as from 1st April, 1958. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staff (England and Wales) and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 7th December, 1957.

SOUTHEND-ON-SEA. GENERAL HOSPITAL. Applications are invited for appointment as SENIOR HOUSE OFFICER to the Orthopædic and Fracture Department. Post vacant 8th December, 1957. The Orthopædic and Fracture Department is the centre for reference of all cases from a large surrounding area, and the post offers excellent experience in all aspects of orthopædic and traumatic surgery under the supervision of and with instructions from the Consultant in charge. Post recognised for the F.R.C.S. Resident or non-resident.

Applications, stating age, qualifications and experience, together with copies of recent testimonials, should be sent to the undersigned by 20th November, 1957. J. C. FIELD, Secretary.

SOUTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. RESIDENT MEDICAL OFFICER (diseases of the chest). Appointment in Junior Hospital Medical Officer grade for initial period of 4 years. Principal duties at Holywood Hall Hospital, Wolsingham, Bishop Auckland. 172 Beds, including major Thoracic Surgical Unit of 20 Beds (T.B. and non-T.B.). Also at Bishop Auckland Chest Clinic (including M.M.R.) and associated hospitals. Furnished or unfurnished accommodation.

Applications, with names and addresses of 3 referees, to Group Secretary/Finance Officer, General Hospital, Bishop Auckland, Co. Durham, to be received by 9th November.

ST. ALBANS CITY HOSPITAL, St. Albans, Herts. (384 Beds.) Locum Tenens ANÆSTHETIC REGISTRAR (resident) required from 20th November to 12th December, 1957, inclusive. Post recognised for D.A. and F.F.A. R.C.S.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

STRATFORD-ON-AVON HOSPITAL. (163 Beds.) RESIDENT HOUSE SURGEON. New post providing excellent experience.

Applications, with 2 recent testimonials, to Hospital Secretary.

STOKE-ON-TRENT. ORTHOPÆDIC HOSPITAL, HARTSHILL, STOKE-ON-TRENT. (78 Beds.) SENIOR HOUSE OFFICER (orthopædics) required. Duties also at North Staffordshire Royal Infirmary.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (815 Beds.) HOUSE OFFICER (general surgery) required, vacant now. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOCKPORT AND BUXTON HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following post, which is approved for pre-registration purposes.

Stockport Infirmary (163 Beds)

HOUSE OFFICER (general surgery and gynæcology). Recognised for the F.R.C.S. Vacant now.

Applications, with copies of 2 testimonials, to the Group Secretary, 59B, Shaw-heath, Stockport.

STOCKTON-ON-TEES. THE CHILDREN'S HOSPITAL, Durham-road, STOCKTON-ON-TEES. (84 Beds.) CLEVELAND HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE OFFICER, the appropriate salary and conditions of service being in accordance with the Ministry of Health Regulations.

Applications, with copies of 2 recent testimonials, should be forwarded to the undersigned at West Lane Hospital, Middlesbrough, as early as possible.

L. BRITTAIN, Group Secretary.

TAPLOW, MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL. HOUSE SURGEON required for the Unit of Obstetrics and Gynæcology, vacant 1st December. Post recognised for M.R.C.O.G.

Applications, stating age, experience, and qualifications with dates, with copies of 2 testimonials, to Secretary.

TAUNTON AND SOMERSET HOSPITAL, Taunton, SOMERSET. (423 Beds.) HOUSE OFFICER (general surgery) required. Pre-registration post recognised for F.R.C.S. 2 posts vacant, 28th November, 1957, and 9th January, 1958, respectively.

Applications, stating age, nationality and qualifications, to the Group Secretary, Taunton Hospital Management Committee, c/o Musgrove Park Hospital, Taunton, Somerset, immediately.

TAUNTON AND SOMERSET HOSPITAL. Senior House OFFICER (general medicine) required. Post now vacant. This post gives opportunity of work in Area Pathological Laboratory if desired.

Applications, stating age, nationality and qualifications, together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset.

TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE OFFICER (anæsthetics) for duties at hospitals within this Group. Resident or non-resident. The post is vacant on 1st December and is recognised for the D.A. and F.F.A.R.C.S. Some previous experience desirable but not essential. Full establishment of junior medical staff.

Applications, with copies of 3 references, to be addressed to the Group Secretary, Worsley House, North Ormesby Hospital, Middlesbrough.

TORQUAY. TORBAY HOSPITAL. (166 general beds.) RESIDENT HOUSE OFFICER (surgical), Male or Female, required approximately 15th December, 1957. Post recognised for F.R.C.S. and pre-registration purposes. There is a complement of 6 Resident House Officers.

Applications, stating qualifications, nationality and age, together with copy testimonials (quoting reference F.955/84), to the Group Secretary, Torquay District Hospital Management Committee, Torbay Hospital, Torquay, S. Devon.

TUNBRIDGE WELLS (near). PEMBURY HOSPITAL, PEMBURY. Applications invited for appointment of SENIOR ORTHOPÆDIC HOUSE SURGEON AND CASUALTY OFFICER (Senior House Officer grade) to begin duties as soon as possible. Recognised F.R.C.S. (Eng.) and tenable for 1 year. Work includes treatment of long and short stay cases and traumatic surgery with large Outpatient and Fracture Clinics under 2 Consultants.

Apply, stating age, qualifications and experience, together with 3 testimonials, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

WARRINGTON INFIRMARY. Applications are invited from Males and Females for the post of RESIDENT CASUALTY OFFICER (graded as Junior Hospital Medical Officer) at the above Hospital. The post becomes vacant on 1st November, 1957, and is recognised for the F.R.C.S. Scale of salary £852 10s.–£55–£1182 10s., less a deduction of £170 for the residential emoluments. A whole-time Senior Hospital Medical Officer is in charge of the Department.

Applications, stating age, experience and qualifications, should be forwarded to—

HENRY L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

WARWICK (near). KING EDWARD VII MEMORIAL CHEST HOSPITAL, Hertford Hill, near WARWICK. (228 Beds.) SENIOR HOUSE OFFICER (resident). Applications invited for this appointment in modern Thoracic Surgical Unit. All forms of major and minor thoracic surgery undertaken. Post offers wide general training in cardiac, œsophageal and pulmonary surgery. Facilities available for postgraduate study. Previous experience in specialty not essential.

Applications to Medical Superintendent.

WORCESTER ROYAL INFIRMARY. (213 Beds.) Senior HOUSE OFFICER (surgical) required for 1st December at this busy acute hospital which is the consultative and accident centre of the Group. The post, which is recognised for the F.R.C.S. examinations, is deputy to the Surgical Registrar and involves some orthopædic work.

Applications to Hospital Secretary.

WELSH REGIONAL BUREAU FOR PRE-REGISTRATION HOSPITAL APPOINTMENTS

It is anticipated that the following Pre-registration HOUSE OFFICER posts at the undermentioned hospitals in the Welsh Region will be vacant on the dates given. These posts have been approved by the Licensing Body for the employment of medical students who, after passing their qualifying examinations, are required to spend a prescribed period in approved hospitals before they become eligible for full registration as medical practitioners.

Application forms may be obtained from the Regional Bureau, Welsh National School of Medicine, 34, Newport-road, Cardiff, Wales, and should be returned not later than 16th November, 1957.

Newport and East Monmouthshire

ROYAL GWENT, NEWPORT, MON. (260 Beds)
- 2 medical—1st February, 1958.
- 3 surgical—1st February, 1958.
- 1 gynæcological (surgical)—1st February, 1958.

ST. WOOLOS, NEWPORT, MON. (441 Beds)
- 2 medical—1st February, 1958.
- 1 surgical—1st February, 1958.
- 1 pædiatric—1st February, 1958. Post recognised for D.C.H.

PONTYPOOL AND DISTRICT, PONTYPOOL, MON. (126 Beds)
- 1 medical—1st February, 1958.
- 1 surgical—1st February, 1958.

Rhymney and Sirhowy Valleys

CÆRPHILLY AND DISTRICT MINERS', CÆRPHILLY, GLAM. (198 Beds). (Married quarters available)
- 1 medical—1st February, 1958.
- 2 surgical—1st February, 1958.
- 1 midwifery—1st February, 1958.

TREDEGAR GENERAL, TREDEGAR, MON. (56 Beds). (Married quarters available)
- 1 surgical—1st February, 1958.

ST. JAMES, TREDEGAR, MON. (160 Beds). (Married quarters available)
- 1 medical—1st February, 1958.
- 1 midwifery—1st February, 1958.

Cardiff

ST. DAVID'S, CARDIFF, GLAM. (570 Beds)
- 3 medical—1st February, 1958.
- 1 orthopædic (surgical)—1st February, 1958.
- 1 pædiatric (medical)—1st February, 1958.
- 1 midwifery—1st February, 1958.

ROYAL HAMADRYAD GENERAL AND SEAMEN'S HOSPITAL, CARDIFF (66 Beds)
- 1 surgical (interchangeable with the post of genito-urinary (surgical) at the Cardiff Royal Infirmary)—1st February, 1958.

Merthyr and Aberdare

MERTHYR GENERAL, MERTHYR TYDFIL, GLAM. (120 Beds)
- 1 medical—1st February, 1958.
- 1 surgical—1st February, 1958.

ST. TYDFIL'S, MERTHYR TYDFIL, GLAM. (375 Beds)
- 1 medical—1st February, 1958.
- 1 surgical—1st February, 1958.

Pontypridd and Rhondda

EAST GLAMORGAN, CHURCH VILLAGE, nr. PONTYPRIDD, GLAM. (316 Beds)
- 2 medical—1st February, 1958.
- 2 surgical—1st February, 1958.
- 2 surgical (orthopædic)—1st February, 1958.
- 2 midwifery—1st February, 1958.
- 1 pædiatric (medical)—1st February, 1958.

Mid Glamorgan

BRIDGEND GENERAL, BRIDGEND, GLAM. (381 Beds)
- 2 medical—1st February, 1958.
- 2 surgical—1st February, 1958.
- 1 midwifery—1st February, 1958.

NEATH GENERAL, NEATH, GLAM. (412 Beds)
- 2 medical—1st February, 1958.
- 2 surgical—1st February, 1958.
- 1 midwifery—1st February, 1958.

Glantawe

SWANSEA GENERAL, SWANSEA, GLAM. (401 Beds)
- 2 medical—1st February, 1958.
- 2 surgical—1st February, 1958.

MORRISTON HOSPITAL, MORRISTON, nr. SWANSEA, GLAM. (501 Beds)
- 2 medical—1st February, 1958.
- 3 surgical—1st February, 1958.
- 1 pædiatric (medical)—1st February, 1958.
- 1 orthopædic (surgical)—1st February, 1958.

LLANELLY HOSPITAL, LLANELLY, CARMS.
- 1 medical—1st February, 1958.
- 2 surgical—1st February, 1958.

West Wales

WEST WALES GENERAL, CARMARTHEN (188 Beds)
- 1 medical—1st February, 1958.
- 1 surgical—1st February, 1958.

PEMBROKE COUNTY WAR MEMORIAL, HAVERFORDWEST, PEMBS. (163 Beds)
- 1 medical—1st February, 1958.
- 1 surgical—1st February, 1958.

Mid Wales

ABERYSTWYTH GENERAL, ABERYSTWYTH (90 Beds)
- 1 medical—1st February, 1958.
- 1 surgical—1st February, 1958.

Cærnarvon and Anglesey

CÆRNARVON AND ANGLESEY GENERAL, BANGOR, CÆRNS. (130 Beds)
- 1 medical—1st February, 1958.
- 1 surgical—1st February, 1958.

LLANDUDNO GENERAL, LLANDUDNO, CÆRNS. (134 Beds)
- 1 medical—1st February, 1958.
- 2 surgical—1st February, 1958.

Clwyd and Deeside

ROYAL ALEXANDRA, RHYL, FLINTS. (136 Beds)
- 1 medical—15th February, 1958.
- 1 surgical—1st February, 1958.

ST. ASAPH GENERAL, ST. ASAPH, FLINTS. (208 Beds)
- 1 midwifery—1st February, 1958.

Wrexham Powys and Mawddach

MÆLOR GENERAL, WREXHAM (591 Beds)
- 2 medical—1st February, 1958.
- 3 surgical—1st February, 1958.
- 1 pædiatric (medical)—1st February, 1958.

WREXHAM WAR MEMORIAL, WREXHAM, DENBS. (230 Beds)
- 1 medical—1st February, 1958.
- 1 surgical—1st February, 1958.
- 1 orthopædic (surgical)—1st February, 1958.

WELSH REGIONAL HOSPITAL BOARD. Registrar, Anæsthetic Department, Morriston General Hospital, near Swansea. Centre for neurosurgery, thoracic and dental surgery. Post recognised for F.F.A.R.C.S., and D.A. examinations. Resident/non-resident.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WELSH REGIONAL HOSPITAL BOARD. Registrar (thoracic medicine), Llangwyfan Hospital, near Denbigh. Modern methods of treatment tuberculosis. 370 adult beds (Male and Female) and children. Hospital also contains major thoracic unit. Subject to review end of first year.

Forms of application from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

WATFORD GROUP OF HOSPITALS. North West METROPOLITAN REGIONAL HOSPITAL BOARD. RESIDENT REGISTRAR in Obstetrics and Gynæcology required for above Group.

Application form obtainable from Group Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by not later than 19th November, 1957.

WATFORD CHEST CLINIC, Peace Memorial Hospital, WATFORD. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR at the above Chest Clinic, and associated beds (tuberculosis 47, chest medicine 16) at Shrodells and Holywell Hospitals. This is a new Chest Clinic. Experience in general medicine and tuberculosis work essential. This chest unit is closely associated with Harefield Hospital, the Physician-in-Charge being on the Consultant staff of this Hospital. Applicants invited to visit the Clinic and should contact the Physician-in-Charge.

Application form obtainable from, and returnable to, the Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by 19th November, 1957.

WESTCLIFF HOSPITAL, Balmoral-road, Westcliff-on-SEA, ESSEX. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade). Post vacant 15th December, 1957. The Hospital covers a wide field of medicine and offers excellent training for general practice.

Applications should be sent to the Secretary, General Hospital, Prittlewell Chase, Southend-on-Sea, Essex, not later than 14th November. J. C. FIELD, Secretary.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens PÆDIATRIC REGISTRAR required for Merthyr and Aberdare area immediately.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (315 Beds.) SENIOR HOUSE OFFICER (orthopædics) required. Post recognised F.R.C.S. Wide experience available under Area Orthopædic team. Appointment for 6 months in first instance. Vacant immediately.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (315 Beds.) HOUSE SURGEON (post recognised by Royal College of Surgeons) required for general surgery with some E.N.T. duties. Approved pre-registration post. Vacant 1st December.

Applications, with copies of 2 testimonials, to Group Secretary.

NORTHERN IRELAND HOSPITALS AUTHORITY. Applications are invited for a whole-time post as REGISTRAR in General Surgery at hospitals managed by the Mid-Antrim Hospital Management Committee. The terms and conditions will be in accordance with the application of the Spens report to Northern Ireland.

Applications to be made on a form obtainable (with further particulars) from the Secretary, Northern Ireland Hospitals Authority, 44–46, Queen-street, Belfast, and to be returned not later than 28th November, 1957.

MICHIGAN, U.S.A. OAKWOOD HOSPITAL, Dearborn, MICHIGAN. Applications are invited for 1 or 2-year approved GENERAL PRACTICE RESIDENCY in modern 234-Bed General Hospital 10 miles from Detroit. Excellent facilities. Hospital approved for exchange-visitor programme. Beginning monthly salary $250 if single, $300 if married. Free housing.

Apply: Director.

U.S.A. BETHESDA HOSPITAL, Cincinnati 6, Ohio, U.S.A. INTERNS—Rotation through Obstetrics, Medicine, Pediatrics and Surgery in a 12-month broad teaching programme. We desire applications from graduate medical doctors giving full details in first letter. $210 per month stipend; access to inexpensive meals; furnished room; uniforms; laundry; hospitalisation, and will advance passage one way.

Please apply to the Superintendent.

CANADA. OSHAWA GENERAL HOSPITAL, Alma street, OSHAWA, ONTARIO. (Modern 350-Bed General Hospital.) Has a vacancy on INTERN STAFF. Training programme in effect. Applicants will be considered for immediate acceptance and also for future appointments. Uniform, room, meals, laundry supplied, in addition to $100 per month.
Reply to W. A. HOLLAND, Superintendent.

CANADA. REGINA GENERAL HOSPITAL, Regina, SASKATCHEWAN, CANADA. Vacancies exist for appointments as RESIDENT and ASSISTANT RESIDENT in services of radiology, pædiatrics and obstetric/gynæcologist in 800-Bed General Hospital. All services very active. Stipend $200 per month for Assistant Resident: $250 for Residents. Full maintenance provided.
Apply: Superintendent.

REDDY MEMORIAL HOSPITAL, Westmount, Montreal. British Graduates required as SENIOR INTERNES from June, 1958. Salary, $150 per month, with full board and lodging. Also, RESIDENT in Medicine. Salary $225.
Apply Executive Director.

Public Appointments

NATIONAL DOCK LABOUR BOARD. Medical Officers. The National Dock Labour Board invites applications from medical practitioners (Male) for the following appointments:—
(*a*) REGIONAL MEDICAL OFFICERS
(i) South-West Region: based on Cardiff and covering the Bristol Channel ports.
(ii) North-East Region: based on Hull and covering the Humber ports and those of the Tyne, Tees and Wear.
(*b*) ASSISTANT MEDICAL OFFICER
North-West Region: to work under the direction of the Regional Medical Officer in charge of the Medical Services at Liverpool, Manchester, Fleetwood, Preston and Barrow.
Candidates should have good clinical background, including general practice experience; first-hand knowledge of industrial medicine will be an advantage.
Salary Scales
(*a*) Regional Medical Officers, £1565–£2100 p.a.
(*b*) Assistant Medical Officer, £1345–£1620 p.a.
Commencing salary according to age and experience. Contributory pension scheme and assisted house purchase.
Fuller particulars of the duties of these posts will be supplied with application forms which are obtainable from the General Manager and Secretary, National Dock Labour Board, 22–26, Albert Embankment, London, S.E.11, to whom they should be returned by 20th November, 1957.

BIRMINGHAM. CITY OF BIRMINGHAM. Public Health DEPARTMENT. Applications are invited for the appointment of ASSISTANT MEDICAL OFFICER (Male or Female) for Maternity and Child Welfare. The duties will be mainly in connection with maternity and child welfare as well as the medical aspects of the care of deprived children in the care of the Children's Department. If the successful applicant has the D.P.H. it is hoped to provide an opportunity to gain administrative experience. Salary scale £1050–£50(3)–£55(5)–£1475 p.a. with placement on the scale according to qualification and experience. Pension scheme (including Widows and Orphans); medical examination.
Applications, giving full particulars of qualifications and experience, together with names of 3 persons to whom reference may be made, to be sent to Medical Officer of Health, Council House, Birmingham, 5, not later than 18th November, 1957.

BRIDLINGTON. BOROUGH OF BRIDLINGTON, URBAN DISTRICT OF FILEY, URBAN DISTRICT OF DRIFFIELD, RURAL DISTRICT OF DRIFFIELD, EAST RIDING COUNTY COUNCIL. Combined appointment of DISTRICT MEDICAL OFFICER OF HEALTH AND COUNTY DIVISIONAL MEDICAL OFFICER. Applications are invited from duly qualified medical practitioners possessing a Diploma in Public Health or similar qualification for the combined appointment of Medical Officer of Health for the Borough of Bridlington, the Filey and Driffield Urban Districts and the Driffield Rural District, and County Divisional Medical Officer for the County Council within the same area together with the Bridlington Rural District (total population 56,700). The successful candidate will be required to take up duty on or about 1st April, 1958. The offices will be held as a joint whole-time appointment. The total combined salary will be £1881 13s. 4d., rising by annual increments to £2208 6s. 8d. Conditions of service in accordance with the Whitley Council recommendations (Medical Council Committee 'C'). The officer will be required to provide a motorcar for the purpose of carrying out his duties and will be paid travelling allowances in respect thereof. The appointment, which will be superannuable, will be subject to the provisions of Section 110 of the Local Government Act, 1933, and the Sanitary Officers (Outside London) Regulations, 1935 and 1951.
Forms of application (and further details regarding the appointment) may be obtained from the Clerk of the County Council, County Hall, Beverley, to whom such forms should be returned by not later than Monday, 25th November, 1957.

THE MEDICAL SERVICE OF THE ROYAL NAVY

VACANCIES FOR MEDICAL OFFICERS

Candidates are invited for Short Service Commissions of 3 years, on termination of which a gratuity of £600 (tax free) is payable. Ample opportunity is granted for transfer to Permanent Commissions on completion of 1 year's total service. Officers so transferred are paid instead a grant of £1500 (taxable).

All entrants are required to be British subjects whose parents are British subjects, medically qualified, physically fit, and to pass an interview.

Full particulars from the Admiralty Medical Department, Queen Anne's Mansions, St. James's Park, London, S.W.1.

BRISTOL. CITY AND COUNTY OF BRISTOL. Department OF PUBLIC HEALTH. Applications are invited from registered medical practitioners, preferably with Diploma in Public Health, for appointment of ASSISTANT MEDICAL OFFICERS (2) for duties in School Health and Maternal and Child Welfare services. Opportunities for suitable candidates to gain experience in other branches of public health service, e.g., port health, housing and mental health work. Good facilities for research work. Successful applicants must devote their whole time to these duties and not engage in private practice. Appointments superannuable; medical examination. Salary £1050–£50 (3)–£1200–£55 (5)–£1475 p.a.
Application forms, to be returned by 16th November, 1957, from Medical Officer of Health, Central Health Clinic, G.P.O. Box No. 201, Tower Hill, Bristol, 2.

MANCHESTER. CITY OF MANCHESTER HEALTH DEPARTMENT. MEDICAL OFFICER (Maternity and Child Welfare). Applications are invited from registered medical practitioners (Male or Female) for the above position on the permanent staff. Applicants should have obstetric and pædiatric experience and will be required to undertake duties principally in Maternity and Child Welfare Clinics. Possession of the D.Obst. R.C.O.G., D.P.H. or D.C.H. qualifications will be an advantage. Salary scale £1050 rising to £1475 p.a. The appointment is subject to a medical examination and the City Council's conditions of service.
Application forms obtained on request, must be returned to the Town Clerk, Town Hall, Manchester, 2, and not to any member of the Council, by the 23rd November, 1957. Envelopes must be endorsed "Medical Officer, Nursing Services Division." Canvassing is prohibited.

MIDDLESBROUGH. COUNTY BOROUGH OF MIDDLESBROUGH. SENIOR ASSISTANT MEDICAL OFFICER OF HEALTH for Maternal and Child Welfare. Applications are invited from registered medical practitioners, preferably with special experience in obstetrics and antenatal care or in child health, for duty in the Corporation's antenatal and child welfare clinics. Whitley Council conditions of service and salary £1200–£50 (3)–£55 (5)–£1625. Superannuation.
Applications, with names of 3 referees, to Medical Officer of Health, 26, Southfield-road, Middlesbrough, by 18th November, 1957.

STOKE-ON-TRENT. CITY OF STOKE-ON-TRENT. PUBLIC HEALTH DEPARTMENT. Applications are invited from qualified medical practitioners for the post of ASSISTANT MEDICAL OFFICER, mainly on the Maternity and Child Welfare Services. Candidates should have experience in diseases of children and obstetrics. Opportunity will be given for hospital contact with Pædiatrics and Obstetrics. The possession of a D.P.H. or D.C.H. will be considered an additional qualification. The salary will be at the rate recommended by the Whitley Council, with commencing salary according to experience. The appointment will be subject to the provision of the National Health Service (superannuation) regulations 1947, and the successful candidate will be required to pass a medical examination.
Forms of application may be obtained from the Medical Officer of Health, Public Health Department, Glebe-street, Stoke-on-Trent, and should be returned, accompanied by copies of not more than 3 recent testimonials, not later than Saturday, 16th November, 1957. HARRY TAYLOR, Town Clerk.

CORK COUNTY COUNCIL. Vacancy for Junior House SURGEON (County Hospital, Mallow). Remuneration £356–£516 p.a.
Application forms and particulars may be obtained from the County Manager, Courthouse, Cork, with whom completed applications should be lodged not later than 5 P.M. on Friday, 22nd November, 1957.

HER MAJESTY'S OVERSEAS CIVIL SERVICE. TriniDAD. Applications invited from doctors with medical qualifications registrable in the United Kingdom for the following posts:
PATHOLOGIST (Grade A) to work under Supervisor of Laboratories, undertake responsibility for all technical methods and processes in examination of specimens and patients in various Pathological Laboratories under Government control; act as Senior Pathologist in absence of Supervisor of Laboratories and in that capacity undertake administrative and financial responsibilities as required. Higher qualification in Pathology desirable plus 5 years whole-time practice of pathology, and experience in morbid anatomy and morbid histology.
Salary scale: £1500 to £1600 p.a. Consulting practice permitted or allowance of £200 p.a. paid in lieu.
PATHOLOGIST (Grade B) to assist Senior Pathologist in pathological and bacteriological work including anatomy and post mortem. Qualification in Pathology or Bacteriology desirable plus at least 3 years postgraduate experience.
Salary scale: £1400 to £1500 p.a.
MEDICAL OFFICERS (Grade B) (Institutions) for general medical surgical and other duties of Hospital Medical Officer in any Institution in the Colony. Higher qualification, or more than 6 years approved post-registration experience required.
Salary scale: £1400 to £1500 p.a.
MEDICAL OFFICERS (Grade C) (Institutions) for general duties of a Resident Medical Officer in any medical Institution in the Colony.
Salary scale: £950 to £1350 p.a.
Appointment on permanent basis with pension (non-contributory) or on short-term contract with gratuity (taxable) £25 to £37 10s. a quarter; or from National Health Service with retention of superannuation rights up to 6 years plus gratuity (taxable) of 20% of aggregate salary. (Only permanent officers are members of Her Majesty's Overseas Civil Service.)
Quarter, if available, at low rental or allowance in lieu. Free passages on appointment for officer and family not exceeding 5 persons in all. Leave passages on certain conditions up to 3 adult fares. Income tax at local rates. Generous leave. Educational facilities.
Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD. 117/38/07).

GOVERNMENT OF QATAR in the Persian Gulf has 2 vacancies in the State Medical Department for:

1. GENERAL SURGEON, who must hold the F.R.C.S.
2. OPHTHALMOLOGIST.

Applicants should state age, qualifications, experience and send copies of recent testimonials.

Salary: In the scale Rs. 3500 per Arabic month (equivalent to £3150 p.a.) rising to Rs. 4100 (equivalent to £3690 p.a.)

Contract offered is for 5 years subject to 6 months probationary period. Gratuity paid on completion of contract. Leave: 6 days for each month of duty. Free accommodation, fuel, light, water. No income-tax.

For further details please apply in writing to Messrs. C. Tennant, Sons, & Co., Ltd., 4 Copthall-avenue, London, E.C.2.

GOVERNMENT OF THE FEDERATION OF NIGERIA. SPECIALIST (Pædiatrician) required to take charge of a children's ward (42 Beds) and outpatient clinic at Lagos General Hospital, to act as consultant in pædiatrics to various hospitals, to assist in building up a comprehensive child health organisation for Lagos, and to organise and take charge of the pædiatric department of the projected Mainland General Hospital, when built. A candidate must possess medical qualifications registrable in the United Kingdom and be a member of one of the Royal Colleges of Physicians, or F.R.F.P.S., who has specialised in pædiatrics.

Appointment:

(*a*) on short term contract with salary £2664 p.a. On completion of contract gratuity (taxable) is paid of £37 10s. for each completed period of 3 months' service (including leave).

(*b*) from National Health Service with salary £2220 p.a., candidate retaining superannuation rights and receiving gratuity (taxable) of 20 % of aggregate of salary.

Quarters at low rental. Free return passages for officer and wife. Return passages for children, to age eighteen, provided cost does not exceed that of 2 adult return passages in any 1 tour of service. Children's (separate domicile) allowance of £75 p.a. for each child under eighteen, ceasing if children join parents in Nigeria. Income-tax at local rates. Local leave permissible and generous home leave after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting BCD.117/14/048).

Miscellaneous

Evans Medical Supplies invite applications from medical practitioners for the post of Head of their Medical Information Department. The post will involve dealing with technical inquiries from doctors and liaison with hospitals, &c., in connection with clinical trials. The post will be based on the Liverpool area. There is a substantial pension and life insurance scheme and the salary will be appropriate to the responsibilities of the post and the qualifications of the successful applicant.—Applications should be made in confidence to the Managing Director of Evans Medical Supplies Limited, Speke, Liverpool 19.

Imperial Chemical Industries Limited, Pharmaceuticals Division, has a vacancy in its new research laboratories at Alderley Park, Cheshire, for a Senior Pharmacologist or Physiologist to study the actions of drugs on the central nervous system. Candidates should preferably be under 35 and salary will be in accordance with age and experience.

Applications with full particulars should be addressed to the Staff Manager, Imperial Chemical Industries Limited, Pharmaceuticals Division, Fulshaw Hall, Wilmslow, Cheshire.

Medical Director, Australian National Airways, (45), returning U.K. mid-1958, seeks position in airline or aviation industry.—Please contact Dr. ROBERT S. FLYNN, 9, McCubbin-street, East Kew, Victoria, Australia (air mail).

Korea. Doctor (Female) required with pædiatric experience; age preferably between 26 and 40. Contract 1 year renewable. Salary £1000 p.a. Equipment allowances and fares paid. 1 month's holiday per year. Duties in Pusan, Korea. —Apply Foreign Relief Secretary, Save the Children Fund, 12, Upper Belgrave-street, S.W.1. Telephone SLOane 9171.

Energetic Doctor living or working in or near the West End of London can obtain permanent position as an extra to his normal work. The remuneration will increase and may become very considerable. Some night work will be required.—Address No. 340, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

THE SHELL PETROLEUM COMPANY LIMITED

invite applications for the post of

DIRECTOR of a Toxicology Laboratory

which it is proposed to develop shortly. Applicants should have a medical qualification and training in either toxicology, physiology or biochemistry. Experience in the planning, development, organisation and administration of a Research Laboratory will be an asset. The Director will be expected to initiate and direct work of this kind and also to supervise the routine screening of new products. He will be expected to develop and maintain liaison with other national and international organisations carrying out work of a similar nature. The salary will depend on age, experience and qualifications, &c., but will not be less than £3500 p.a. There is a pension fund. Sympathetic consideration will be given to candidates with present part-time academic connections.

Please write, giving full details, to:

Shell Petroleum Company Limited,
Staff Department (R/B),
16, Finsbury Circus, London, E.C.3.

Required, Assistant. No view. Partnership of 4, outer East London suburb. Cottage Hospital and appointments. English Protestant bachelor preferred. Suit man who wants a year's introduction to good practice. Salary £1200 p.a. inclusive. —Address No. 342, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Locum wanted, rural multiracial practice, Southern Rhodesia, 3–6 months from April, 1958. Pleasant healthy district.—Details from DOCTOR, Box 567, Salisbury, S. Rhodesia.

Doctors requiring applications, theses copied: Write to MANTON (WESTMINSTER) LTD., 98, Victoria-street, S.W.1 (VIC 0141) who are specialists.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £2 2s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Typewriting and Duplicating. First-class work at moder- ate prices by experienced medical typists. Electric machines. —SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

Microscopes. Immediately available from Stock. Largest selection of all types. Terms if required.—WALLACE HEATON LTD., 127, New Bond-street, W.1.

Consulting Room, furnished, with service, telephone service, receptionist, use waiting room; 1st floor.—50, Great Cumberland-place, W.1. PAD. 7800.

Old medical books, pictures, manuscript notebooks, letters, &c., wanted by a collector.–Address, No. 343, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

SWISS PHARMACEUTICAL COMPANY

of international repute

invites applications from medical men with literary ability for a permanent and pensionable appointment to the staff of the English Section of their

MEDICAL INFORMATION DEPARTMENT

in Basle, Switzerland. This job demands a wide knowledge of all aspects of medico-literary work, and preference will be given to candidates with full- or part-time experience of medical editing and journalism. An M.D. or M.R.C.P. is desirable but not essential providing the candidate is reasonably familiar with contemporary medical practice and literature. An appreciation of the problems of the pharmaceutical industry would also be an advantage. Ability to speak German or French would be useful. The work is varied and interesting and will bring the successful applicant into contact with the pharmacological and clinical research departments. Starting salary will be between Swiss Francs 15,000 and 20,000, depending on experience and qualifications. (Income tax is considerably lower than in the U.K.)

Applications, which will be treated in strict confidence, should give full details. A short list of applicants will be invited for interview in London in the first instance.

Address, No. 341, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Mr. Arthur Shaw, Medical Agent, wishes to announce that the book he is now writing is expected to be published in 1958; a further announcement will be made later.

ARTHUR SHAW

Medical Agent and Insurance Consultant,

PREMIER BUILDINGS, 88, CHURCH STREET, LIVERPOOL, 1

Telephone: Royal 8116 Telegrams: "Organic," Liverpool

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ROUSSEL

UNG. HYDROCORTISON. B.N.F

ROUSSEL

The new *British National Formulary* becomes official on November 1st 1957, and contains a description of Hydrocortisone Ointment "in a suitable greasy basis . . .", but no description of Hydrocortisone in a "non-greasy vehicle".

Experience has shown that a non-greasy vehicle is more suitable than a greasy one in the majority of cases.

To avoid any ambiguity when prescribing the former, it would be useful to add the words "**non-greasy**" as follows:

HydroCORTISYL SKIN OINTMENT
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ROUSSEL

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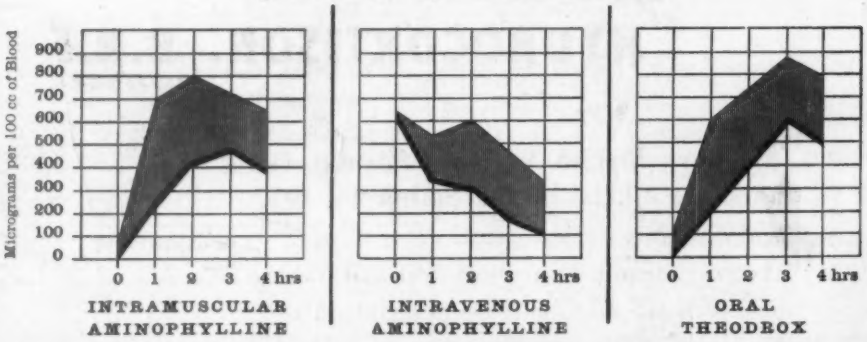
LS/3B

A comparison of Oral Theodrox and Parenteral Aminophylline therapy.

Blood levels of Theophylline produced by three routes



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Recent trials have shown that aminophylline is still the most satisfactory derivative of theophylline. [1, 2] **'Theodrox' enables its advantages to be utilised fully, as higher doses of aminophylline can be given with consequential improvement in therapeutic effect.**

REFERENCES:

1. *Brit. med. J.* (1957) *2:* 67
2. *Ibid.*, page 74

Each 'Theodrox' tablet contains gr. 3 aminophylline and gr. 4 dried aluminium hydroxide gel.

'Theodrox' with Phenobarbitone tablets contain in addition gr. ¼ phenobarbitone and are indicated when a degree of sedation is also required.

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